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General trends of chromosomal evolution in Aphidococca (Insecta, Homoptera, Aphidinea + Coccinea)

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Abstract

Parallel trends of chromosomal evolution in Aphidococca are discussed, based on the catalogue of chromosomal numbers and genetic systems of scale insects by Gavrilov (2007) and the new catalogue for aphids provided in the present paper. To date chromosome numbers have been reported for 482 species of scale insects and for 1039 species of aphids, thus respectively comprising about 6% and 24% of the total number of species. Such characters as low modal numbers of chromosomes, heterochromatinization of part of chromosomes, production of only two sperm instead of four from each primary spermatocyte, physiological sex determination, "larval" meiosis, wide distribution of parthenogenesis and chromosomal races are considered as a result of homologous parallel changes of the initial genotype of Aphidococca ancestors. From a cytogenetic point of view, these characters separate Aphidococca from all other groups of Paraneoptera insects and in this sense can be considered as additional taxonomic characters. In contrast to available paleontological data the authors doubt that Coccinea with their very diverse (and partly primitive) genetic systems may have originated later then Aphidinea with their very specialised and unified genetic system.

Keywords

Aphids, scale insects, chromosome numbers, genetic systems, evolution, phylogeny

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Introduction

The name Aphidococca was recently introduced by Kluge (2010) for the taxon combining two closely related groups of Homoptera insects, aphids and scale insects. According to the paleontological data (see for example, Shcherbakov and Popov 2002, Shcherbakov 2007) scale insects (Coccinea) could originate from ancient aphids (Aphidinea) or aphid-like ancestors in the Triassic (Fig. 1). The close relationship of both groups is well supported by numerous morphological, anatomical, embryological, cytogenetic, physiological and other characters and, as it seems, is not disputed by any modern taxonomists. In the framework of cladistic taxonomy, aphids and scale insects are considered as sister groups (see for example, Wojciechowski 1992, Gullan and Cook 2007 and others) originating from a common ancestor. However, various theoretical generalizations and attempts at analysis of any biological characters of aphids and scale insects are usually done separately for these groups. Below we shall try to analyze aphids and scale insects as a united group which can be exactly contrasted to other related groups of Paraneoptera insects with particular regard to their cytogenetics.

At present, about 5000 species of aphids and 8000 species of scale insects have been recorded from all over the world (Favret and Eades in on-line "Aphid species file" database: http://aphid.speciesfile.org, Ben-Dov et al. in on-line "ScaleNet" database: http://www.sel.barc.usda.gov/scalenet/scalenet.htm). There is no general agreement on the higher classification within both groups; the number of accepted families and their relationships are disputed in the papers of different modern authors. In general, the opposite tendencies (splitting vs. integration) of the families take place in scale insect and aphid modern systematics. Thus, some modern coccidologists (for example, Hodgson 2014) accept till 33 extant families of scale insects in contrast to the 15-19 "large" traditionally accepted families (Danzig 1986, Danzig and Gavrilov-Zimin 2014), whereas the last taxonomic catalogue of aphids (Remaudière and Remaudière 1997) places all recent "true aphids" in the single family Aphididae, in contrast to the acceptance of 6-13 true aphid families by some other authors in addition to two families of "not true aphids", Adelgidae and Phylloxeridae (Börner 1952, Shaposhnikov 1964, Heie 1987, Heie and Wegierek 2009a, b). These opposite tendencies in the systematics of scale insects and aphids reflect, to our mind, the generally higher biological diversity of scale insects, which demonstrate more patterns of morphological, cytogenetic, physiological, and ecological specialization than aphids. Here, for further discussions we shall follow the system and nomenclature of Paraneoptera accepted recently in Gavrilov-Zimin and Danzig (2012) and Danzig and Gavrilov-Zimin (2014):

Phylogenetic line **Paraneoptera Martynov, 1923** (including 7 orders: Zoraptera, Copeognatha, Parasita, Thysanoptera, Homoptera, Coleorrhyncha, Heteroptera)
Cohort **Hemiptera Linnaeus, 1758** (= Condylognatha Börner, 1904, non Hemiptera auct.)
Superorder **Thysanoptera Haliday, 1836**
Superorder **Arthroidignatha Spinola, 1850** (= Hemiptera auct. non Linnaeus, 1758; = Rhynchota auct. non Burmeister, 1835)

Order **Coleorrhyncha Meyers & China, 1929**
Order **Heteroptera Latreille, 1810** (= Hemiptera auct. non Linnaeus, 1758)
Order **Homoptera auct. non Latreille, 1810**
Suborder **Cicadinea Batsch, 1789**
Suborder **Psyllinea Latreille, 1807**
Suborder **Aleyrodinea Newman, 1834**
Suborder **Aphidinea Latreille, 1802**
Superfamily **Adelgoidea Annand, 1928**
Superfamily **Phylloxeroidea Herrich-Schaeffer in Koch, 1854**
Superfamily **Aphidoidea Latreille, 1802**
Suborder **Coccinea Fallén, 1814** (= Coccoidea auct., Gallinsecta De Geer, 1776)
Superfamily **Orthezioidea Amyot & Serville, 1843** (=Paleococcoidea Borchsenius, 1950; = Archeococcidea Bodenheimer, 1952)
Superfamily **Coccoidea Fallén, 1814** (=Neococcoidea Borchsenius, 1950; = Neococcidea Bodenheimer, 1952)

Within the scale insects we recognize 19 extant familes (Table 1). Within the aphids we follow the system of Shaposhnikov (1964, 1985) with minor changes (taking into account some conclusions of Heie and Wegierek 2009a, b) (see Table 3), and accept 15 recent families.

In the present paper we shall try to summarize data on chromosomal numbers, karyotypes and genetic systems of Aphidococca, mainly with regard to the evolutionary significance of these data, and try to demonstrate some previously neglected parallel tendences in the chromosomal evolution of aphids and scale insects. Two catalogues of chromosomal numbers and genetic systems are used as the basis for this discussion – the catalogue recently published by the first author (Gavrilov 2007) for scale insects, and a catalogue for

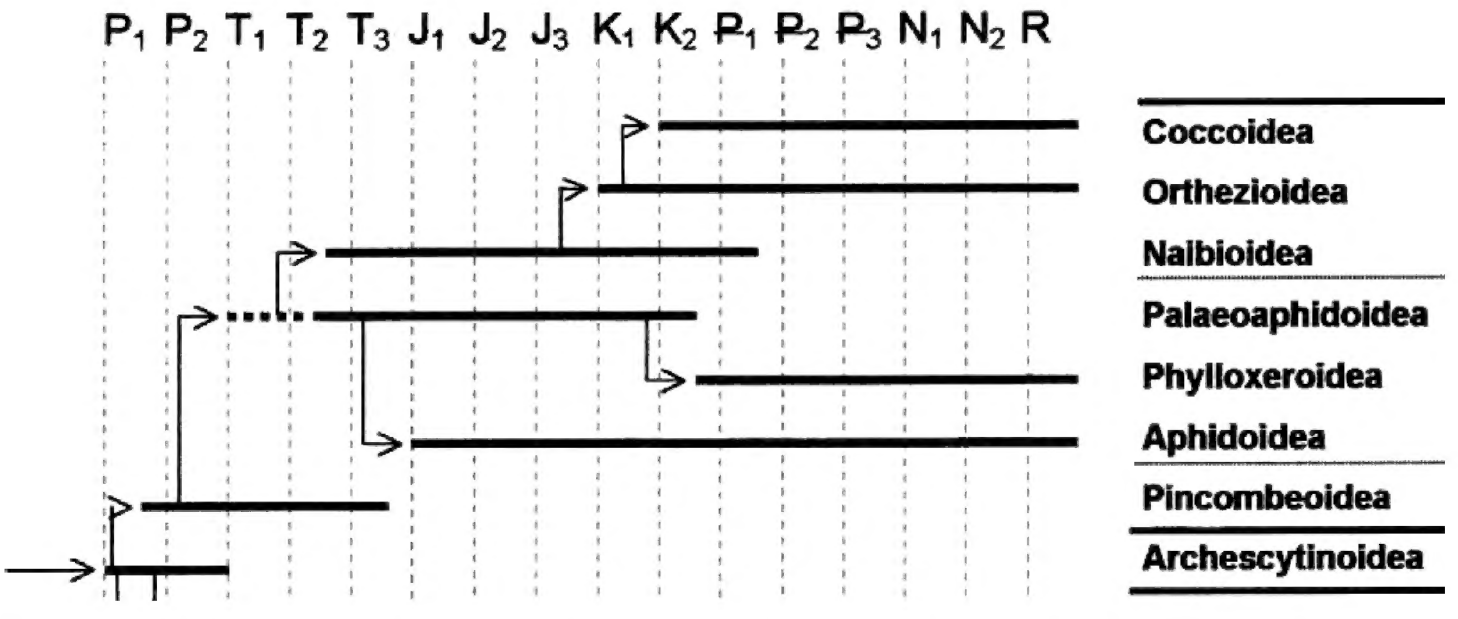

Figure 1. Phylogeny of Aphidococca placed on geochronological scale (after Shcherbakov and Popov 2002). Time periods: $\mathbf{P_1}$, $\mathbf{P_2}$ Early (Lower) and Late (Upper) Permian $\mathbf{T_1}$, $\mathbf{T_2}$, $\mathbf{T_3}$ Early, Middle and Late Triassic $\mathbf{J_1}$, $\mathbf{J_2}$, $\mathbf{J_3}$ Early, Middle and Late Jurassic $\mathbf{K_1}$, $\mathbf{K_2}$ Early and Late Cretaceous $\mathbf{P_1}$ Palaeocene $\mathbf{P_2}$ Eocene $\mathbf{P_3}$ Oligocene $\mathbf{N_1}$ Miocene $\mathbf{N_2}$ Pliocene **R** present time (Holocene).

Table 1. Variation of diploid chromosome number in 19 families of scale insects. **Kv** (index of karyotypic variability is provided only for the most studied families).

Family	Number of nominal taxa		Number of studied taxa		Range of variability	Kv	Modal chromosome numbers
	Genera	Species	Genera	Species			
Ortheziidae	22	202	3	3	14–18	-	-
Carayonemidae	4	4	-	-	-	-	-
Margarodidae s.l.	77	442	20	33	4–40	0.21	4, 6
Xenococcidae	3	33	-	-	-	-	-
Phenacoleachiidae	1	1	1	1	8	-	-
Pseudococcidae	279	2281	47	129	8–64	0.08	10
Eriococcidae	91	657	18	96	4–192	0.41	18
Kermesidae	10	90	1	2	26	-	-
Dactylopiidae	1	10	1	7	10–16	0.28	10
Asterolecaniidae	39	393	4	4	6–24	-	-
Stictococcidae	3	17	-	-	-	-	-
Micrococcidae	2	8	-	-	-	-	-
Aclerdidae	5	58	1	3	16–18	-	-
Coccidae	171	1133	27	50	10–36	0.22	16, 18
Kerriidae	9	102	2	4	18–20	-	-
Beesoniidae	6	16	-	-	-	-	-
Conchaspididae	4	30	1	1	12	-	-
Phoenicococcidae s.l. (including Halimococcidae)	6	22	5	7	10–18	-	10
Diaspididae	405	2479	68	141	6–18	0.04	8
Total	**1138**	**7978**	**199**	**482**	**4–192**		**8, 10, 18**

aphids, compiled in the present paper from numerous scattered publications on aphid cytogenetics, the main sources being the tables in Kuznetsova and Shaposhnikov (1973), Blackman (1980, 1986) and the data from the monographs of Blackman and Eastop (1994, 2006) as well as from the on-line compilation of these monographs (Blackman and Eastop 2015: http://www.aphidsonworldsplants.info). We hope the combined catalogue will be useful for all collegues irrespective of any of our theoretical speculations.

Chromosome numbers

To date chromosome numbers have been reported for 482 species of scale insects belonging to 14 of the 19 known families and for 1039 species of aphids belonging to 14 families (all of those accepted here for the recent aphid fauna) (Tables 1–4), thus respectively comprising about 6% and 24% of the total number of coccid and aphid species. Thus, the greater knowledge of aphid karyotype diversity in contrast to that of scale insects is obvious at the species level as well as for the higher taxa in both these groups.

Table 2. Additions to the Gavrilov's (2007) catalogue of chromosome numbers and genetic systems of scale insects. (**H** – heterochromatinization of one haploid set of chromosomes without details of genetic system; **P(o)** – obligatory pathenogenesis).

Taxon	2n	Genetic system	Reference
Fam. Pseudococcidae			
Balanococcus boratynskii Williams, 1962	10	Lecanoid	Gavrilov and Trapeznikova 2010 [Belgorod Prov., Russia]
Brevennia operta (Borchsenius, 1949)	10	?	Gavrilov-Zimin 2011 [Turkey]
Peliococcopsis priesneri (Laing, 1936)	10	Lecanoid	Gavrilov-Zimin 2011 [Turkey]
Phenacoccus hordei (Lindeman, 1886)	10	Lecanoid	Gavrilov and Trapeznikova 2010 [Belgorod Prov., Russia]
Ph. specificus Matesova, 1960	10	?	Gavrilov-Zimin 2011 [Turkey]
Ph. peruvianus Granada de Willink, 2007	10	Lecanoid	Gavrilov and Trapeznikova 2010 [Portugal]
Ph. phenacoccoides (Kiritshenko, 1932)	10+Bs	Lecanoid	Gavrilov-Zimin 2011 [Turkey]
Ph. prope *avenae* Borchsenius, 1949	10	Lecanoid	Gavrilov and Trapeznikova 2010 [Portugal]
Ph. tergrigorianae Borchsenius, 1956	10	Lecanoid	Gavrilov-Zimin 2011 [Turkey]
Puto superbus (Leonardi, 1907)	16/17	XX/X0	Gavrilov-Zimin 2011 [Turkey]
Rhizoecus halophilus (Hardy, 1868)	10	Lecanoid	Gavrilov and Trapeznikova 2010 [Bulgaria]
Trabutina crassispinosa Borchsenius, 1941	16	?	Gavrilov-Zimin 2011 [Turkey]
Trionymus artemisiarum (Borchsenius, 1949)	10	Lecanoid	Gavrilov-Zimin 2011 [Turkey]
T. haancheni MkKenzie, 1960	16	Lecanoid	Gavrilov and Trapeznikova 2007 [USA]
T. radicum (Newstead, 1895)	10	Lecanoid	Gavrilov and Trapeznikova 2010 [Bulgaria]
Fam. Eriococcidae			
Acanthococcus lactucae Borchsenius, 1949	16	?Comstockioid	Gavrilov-Zimin 2011 [Turkey]
Fam. Kermesidae			
Kermes roboris (Fourcroy, 1785)	26	?Comstockioid	Gavrilov-Zimin 2011 [Turkey]
Fam. Aclerdidae			
Aclerda pseudozoysiae Gavrilov-Zimin, 2012	16	H	Gavrilov-Zimin 2012 [New Guinea, Indonesia]
A. takahashii Kuwana, 1932	18	P(o)	Gavrilov-Zimin 2012 [Sulawesi, Indonesiai]
Fam. Coccidae			
Phyllostroma myrtilli (Kaltenbach, 1874)	16	P, deuterotoky	Gavrilov and Trapeznikova 2008 [Bulgaria]
Lecanopsis turcica (Bodenheimer, 1951)	18	H	Gavrilov-Zimin 2011 [Turkey]
Acanthopulvinaria orientalis (Nasonov, 1908)	18 16	H H	Gavrilov 2007 [Astrakhan, Russia] Gavrilov-Zimin 2011 [Turkey]
Anapulvinaria pistaciae (Bodenheimer, 1926)	16?	H	Gavrilov-Zimin 2011 [Turkey]

The smallest chromosome number is the same for aphids and for scale insects, 2n=4, and known in species of the tribe Iceryini (Coccinea: Margarodidae), in the genus *Apiomorpha* Rübsaamen, 1894 (Coccinea: Eriococcidae) (Hughes-Schrader

Table 3. Variation of diploid chromosome number in 14 families of aphids.

Family	Number of nominal taxa		Number of studied taxa		Range of variability	Kv	Modal chromosome numbers
	Genera	Species	Genera	Species			
Adelgidae	7	69	7	18	16–24	0.22	-
Phylloxeridae	8	73	4	10	6–12	0.45	-
Eriosomatidae	53	369	28	85	6–38	0.16	10, 12, 20
Mindaridae	1	9	1	2	8–12	0.30	-
Lachnidae	18	401	11	73	6-c.60	0.20	10, 12, 14
Hormaphididae	44	221	9	26	8- c.50	-	12
Thelaxidae	4	18	3	8	8–56	0.66	-
Tamaliidae	1	6	-	-	-	-	-
Aiceonidae	1	18	1	1	18	-	-
Anoeciidae	2	30	1	7	6–12	0.50	-
Phloeomyzidae	1	1	1	1	10	-	-
Greenideidae	16	178	6	21	7–40	0.36	-
Drepanosiphidae	92	573	48	141	6-c. 48	0.09	8, 14, 18
Chaitophoridae	13	178	4	39	(4?) 6–40	-	-
Aphididae	273	3033	120	605	4–72	0.03	8, 10, 12
Total	**534**	**5177**	**243**	**1039**	**4–72**		

1925, 1930, 1948, 1963) and in the genus *Amphorophora* Buckton, 1876 (Aphidinea: Aphididae) (Blackman 1985). The greatest numbers are 2n=72 (in *Amphorophora sensoriata* Mason, 1923) (Blackman 1980) and 2n≈192 (in *Apiomorpha macqueeni* Froggatt, 1929 (Cook 2000). It is interesting that, both in aphids and in scale insects, the entire range of variation of chromosome number for the suborders is found in one genus in each group – *Amphorophora* in Aphidinea and *Apiomorpha* in Coccinea.

The range of diploid number variability, 2n=4-192, demonstrated by Aphidococca is wider than in any other group of Paraneoptera, including even such huge groups as Cicadinea and Heteroptera. Thus, for the groups of Homoptera nearest to Aphidococca the following diploid chromosome numbers have been reported: Aleyrodinea, 2n=20-26 (Blackman and Cahill 1998, but only a few species were studied until now); Psyllinea, 2n=8-26 (Maryańska-Nadachowska 2002); Cicadinea, 2n=8-38 (Emeljanov and Kirillova 1989, 1991). For Heteroptera the range of variability reported is 2n=6-80 (Ueshima 1979, Kuznetsova et al. 2011), for Thysanoptera 2n=20-106 (Brio et al. 2010), for Parasita (Mallophaga + Anoplura) 2n=4-24 (Golub and Nokkala 2004), and for the most ancient and primitive Paraneoptera group, Copeognatha – 2n=14-30 (Golub and Nokkala 2009).

Modal chromosomal numbers of Aphidococca as a whole, 2n=8, 10, 12, 18 are lower (with a small overlap) than in other Homoptera, and most other Paraneoptera groups that have been sufficiently studied to provide reliable data. Thus, comparable modal numbers are 2n=26 for Psyllinea (Maryańska-Nadachowska 2002), 2n=18, 20, 22, 26, 30 for Cicadinea (Emeljanov and Kirillova 1989, 1991), 2n= 14, 22, 26, 28,

34 for Heteroptera (Ueshima 1979, Kuznetsova et al. 2011), and 2n=18 for Copeognatha (Golub and Nokkala 2004). Aleyrodinea and Thysanoptera are too poorly studied for reliable comparison, but for both these groups there are no recorded chromosome numbers lower than 2n=20. What can be a reason for the comparatively low modal numbers of Aphidococca? It is well known that there is no direct correlation between chromosomal number and complexity of an organism. On the other hand, if we look for the most general character that Aphidococca share with another group with low chromosomal numbers, the Parasita, but not with other Paraneoptera groups, we shall see that the tendency for lower modal numbers within the Paraneoptera correlates with a tendency to larvalization of imaginal structures or neoteny, with reduction of the number of postembryonic stages to three—five in Aphidococca and Parasita, in comparison with the six developmental stages usually found in most Paraneoptera.

The karyotype diversity within Aphidococca families can be characterized by a simple index of karyotypic variability (Kv) which is equal to the quantity of different diploid chromosome numbers in the taxon, divided by the number of cytogenetically studied species in this taxon. For example, in the family Diaspididae (Coccinea) six variants (2n= 6, 8, 10, 12, 16, 18) of the chromosomal number are known for 141 studied species. So, for Diaspididae, Kv is equal 6/141=0.04. Of course, Kv, based on the present available data may be changed when more species are studied, but it seems this change will not be very significant. Thus, if we calculate Kv for aphid families based on the old catalogue of Kuznetsova and Shaposhnikov (1973), we obtain values similar to those based on the present catalogue (Table 3), although the number of species studied has meanwhile increased 3–4 times. It is easy to see that Kv is smallest in the largest families of Aphidococca which include numerous poorly identified (recently diverged?) species: Aphididae (0.03), Diaspididae (0.04), Pseudococcidae (0.08). On the contrary, ancient families with a limited number of recent species show comparatively large Kv-s: Adelgidae (0.22), Phylloxeridae (0.45), Margarodidae s.l. (0.21). High Kv-s in some other families, for example, Eriococcidae (0.45) or Thelaxidae (0.66), are connected mainly with enormous variability of chromosomal number not in the family as a whole, but in one of the genera (*Apiomorpha* and *Glyphina* Koch, 1856 respectively).

In the higher (above family level) taxonomic groups of Paraneoptera the utility of Kv index is currently limited by the low percentage of studied species and by limited variation of chromosomal number itself, because there are thousands of species in these higher taxa, whereas chromosomal numbers higher than 2n=60 are very rare and higher than 2n=192 are unknown.

Intrageneric and intraspecific chromosomal variability

A typical Aphidococca karyotype has rod-like chromosomes whose number is more or less stable within a genus (with some notable exeptions which will be discussed below). For example, in the species-rich genus *Aphis* Linnaeus, 1758, the diploid chromosome number in majority of studied species is eight (2n=8) with only a few exceptions.

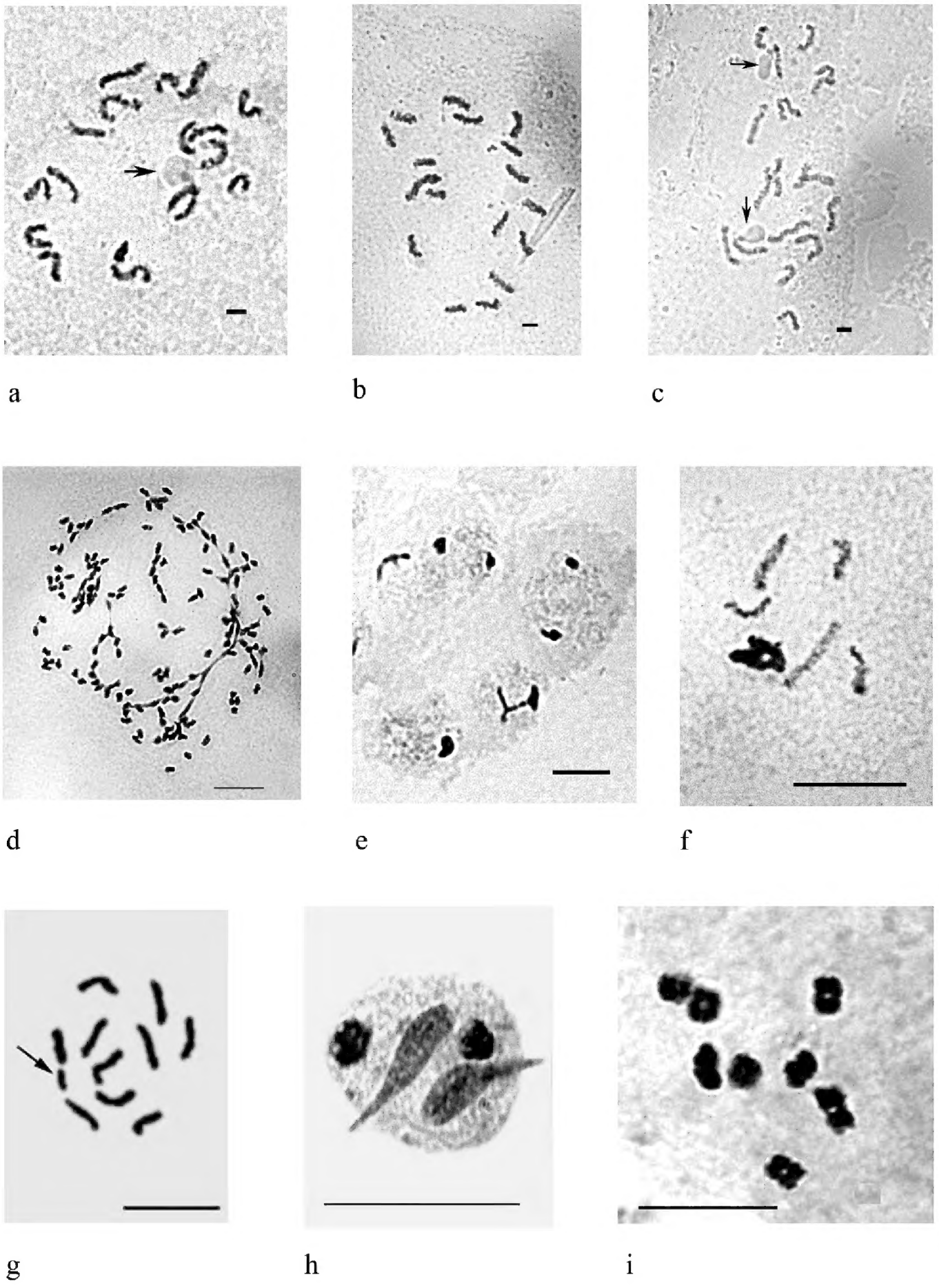

Figure 2. Mitotic and meiotic chromosomes of different scale insects. **a–c** *Puto superbus* (Leonardi, 1907), **a** cell of female embryo, 2n=18 **b–c** cells of male embryo, 2n=17, chromosomes with NORs are arrowed **d** *Heliococcus sulci* Goux, 1934, polyploid cell, about 140 chromosomes with numerous agglutinations **e** *Peliococcopsis priesneri* (Laing, 1936), male embryonic cells at interphase stage with one haploid set heterochomatinized **f** *Planococcus vovae* (Nasonov, 1908), male embryonic cell with one haploid set heterochomatinized **g** *Dysmicoccus multivorus* (Kiritshenko, 1936), embryonic cell with 2n=10 + B, additional chromosomal element arrowed **h** *Chloropulvinaria aurantii* (Cockerell, 1896), 2n=26, spermatid **i** *Protopulvinaria pyriformis* (Cockerell, 1894), 2n=16, oogonial metaphase I. Bar = 10 μm.

Moreover, most of the species in the young and large tribe Aphidini of the family Aphididae have 2n=8, and the same situation applies to the youngest and largest family of scale insects, Diaspididae, the overwhelming majority of species of which also have 2n=8. On the other hand, many genera of Aphidococca demonstrate significant or even extraordinary variation of chromosome number, and, moreover, several diploid numbers can be found in the same nominal species. The most impressive example of such variation is in the scale insect genus *Apiomorpha* with its 42 diploid numbers, ranging from 2n=4 to 2n≈192 in 47 studied species (Hughes-Schrader 1925, 1930, 1948, 1963, Cook 2000, 2001). A number of aphid genera, for example, *Phylloxera* Boyer de Fonscolombe, 1834, *Glyphina* Koch, 1856, *Forda* von Heyden, 1837, *Tetraneura* Hartig, 1841, *Cinara* Curtis, 1835, *Lachnus* Burmeister, 1835, *Trama* von Heyden, 1837, *Amphorophora* Buckton, 1876, *Euceraphis* Walker, 1870, *Chaitophorus* Koch, 1854 and others also demonstrate a great variability in diploid number both between and within nominal species (see Table 4).

Polyploidy is a very rare phenomenon in Aphidococca as in other Paraneoptera and probably does not play a significant role in the evolution of the group. For scale insects a polyploid (triploid) karyotype was reported for *Physokermes hemicryphus* (Dalman, 1826) from the family Coccidae (Nur 1979), but theoretically may be found to occur in some other species of soft scales, felt scales or mealybugs which have chromosome numbers three or four times those of species known to be diploid in the same genera. In aphids polyploid species are not known at all, but several cases of polyploidization in parthenogenetic populations have been reported (see discussion in Blackman 1987). On the other hand, females usually have highly polyploid cells (Fig. 2d) in bacteriomes, peculiar organs which include intracellular symbiotic bacteria.

Accessory chromosomal elements have been found in several species of mealybugs (Pseudococcidae) (Nur et al. 1987, Gavrilov 2007) (Fig. 2g), in one species of the Margarodidae (Hughes-Schrader 1942), in two species of soft scales (Coccidae) (Gavrilov 2007) and in some armored scales (Diaspididae) (Brown 1960). Blackman (1980, 1990) noted presumed B-chromosomes in numerous aphid species from different families, especially in anholocyclic populations, and these B-chromosomes are probably relicts of multiple X-chromosomes.

Evolution of genetic systems

In contrast to other Paraneoptera, all Aphidococca have spermatocyte and oocyte meiosis in larvae or in neotenic females (which are in fact equivalent to larvae as in scale insects) and demonstrate a multiplicity of very different and unique genetic systems, which are probably based on an original XX-X0 system, considered by Blackman (1995) as ancestral for all Paraneoptera insects (Fig. 3). In species possessing this system, the sex of the progeny is determined during spermatogenesis. Spermatozoa with X-chromosomes produce females and spermatozoa without X-chromosomes produce males. This usual type of XX-X0 spermatogenesis (similar to that of Copeognatha, for example) is known

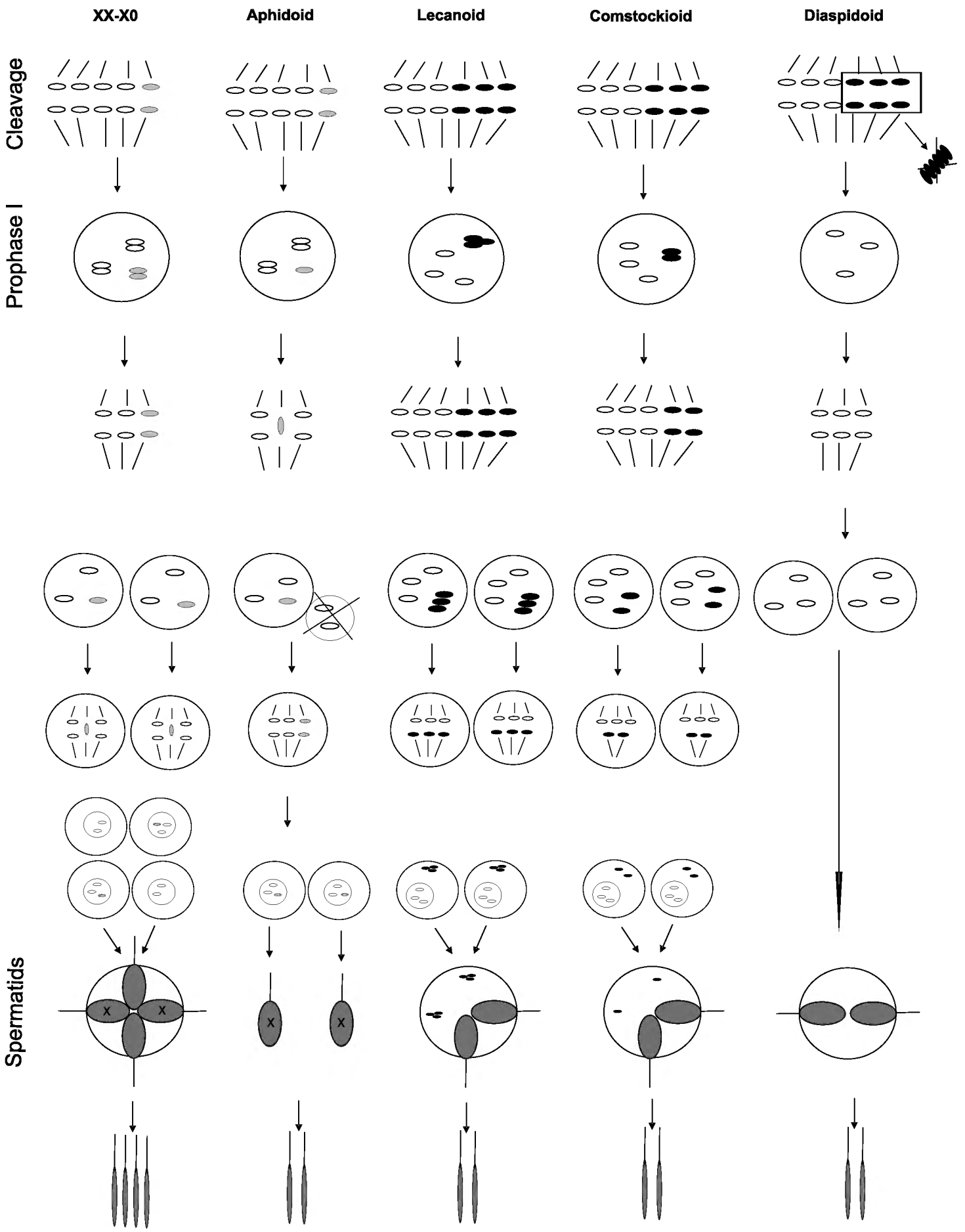

Figure 3. Meiosis and spermatogenesis encountered in different genetic systems of Aphidococca.

in some primitive scale insects (some Margarodidae, Ortheziidae, genus *Puto* Signoret, 1875 (Pseudococcidae)) (Hughes-Schrader 1931, 1942, 1944, 1955, Brown and Cleveland 1968) with only one peculiar character – spermatocytes fuse to form a quadrinucleate spermatid (Fig. 3). This fusion can be considered as a unique apomorphy of Coccinea. In some genera of Margarodidae, such as *Aspidoproctus* Newstead, 1901, *Protortonia*

Townsend, 1898, *Llaveia* Signoret, 1876, *Llaveiela* Morrison, 1927, *Nautococus* Vayssière, 1939 (all from the subfamily Monophlebinae) XX-X0 spermatogenesis is also complicated by the enclosure of meotic prophase I chromosomes in peculiar separate vesicles, instead of a single nuclear membrane. This phenomenon was discovered by F. Schrader and S. Hughes-Schrader and was comprehensively reviewed by Hughes-Schrader (1948). Moreover, it is interesting to note that in *Protortonia* (Coccinea: Margarodidae), in the second meiotic division, all chromosomes form a chain stretched between the two poles of the cell (Schrader 1931), which is similar to the well-known example of chain formation in plants of the genus *Oenothera* Linnaeus, 1753 (Onagraceae) and some other plants and animals (White 1973).

In most cases, species with the XX-X0 system have ony one pair of sex chromosomes in their karyotypes. For example, females of *Porphyrophora polonica* (Linnaeus, 1758) (Coccinea: Margarodidae) have 2n=12+XX and males have 2n=12+X. However examples of multiple sex chromosomes are also known. Thus, species of the family Adelgidae (Aphidinea) have up to four pairs of X chromosomes, and some species of the families Phylloxeridae, Eriosomatidae, Lachnidae and Drepanosiphidae (Aphidinea) have one-two pairs of sex chromosomes (see Table 4). In scale insects, only *Matsucoccus gallicolus* Morrison, 1939 (Margarodidae) has a multiple sex chromosome system with 6 pairs of X chromosomes (2n=28+12X in females and 2n=28+6X in males), which probably evolved as a result of fragmentation of an initial pair of X chromosomes (Hughes-Schrader 1948) and it seems the number of sex chromosomes in this species is the highest known in Insecta. Multiple sex chromosomes are also known in Cicadinea and Heteroptera and can be probably considered as a non-unique apomorpic character in different genera of proboscidian insects (Arthroidignatha). This character is not known in studied Copeognatha (Golub and Nokkala 2009), which is considered as an ancestor group for proboscidians.

Hales (1989) reported a peculiar fusion of multiple X chromosomes with autosomes (X_1+A, X_1, X_2+A, X_2) in somatic cells of *Schoutedenia lutea* (van der Goot, 1917) (Aphidinea, Greenideidae), that demonstrates a special genetic system unknown in other aphids and in Paraneoptera as a whole, but this phenomenon needs further investigation.

Hovewer, in the majority of studied scale insects and in all studied aphids sex determination is not brought about by stochastic combination of male and female chromosome sets during fertilization, because male and female gametes in most Aphidococca are cytogenetically identical and physiological sex determination takes place. Thus, in all studied Aphidinea, gametogenesis is of a unified type and based on an XX-X0 mechanism, but has unique features which are probably unknown in any other animals with XX-X0. One of the secondary spermatocytes (which includes autosomes only) is smaller in size and degenerates just after anaphase I. The second, larger spermatocyte gives origin to two sperms; both with one X-chromosome (see Manicardi et al. 2015 and our Fig. 2). Thus, aphid males give rise only to female-producing sperm, and sexual females also produce only female-producing oocytes, so that all sexually-produced progeny are female. On the other hand, parthenogenetic females can pro-

duce embryos which are either XX or X0, using a special cytological mechanism in which the X-chromosome is lost in some of the oocytes (Orlando 1974, Blackman and Hales 1986). Thus, sex of progeny is totally dependent on the physiology of the parthenogenetic female, which starts to produce sexuales under certain environmental conditions. This mode of gametogenesis is closely connected with cyclic parthenogenesis and is undoubtedly a unique apomorphy of Aphidinea. In general we suggest that the genetic system of aphids could be termed the Aphidoid system for the uniformity with the names of the genetic systems of scale insects (see below).

The majority of scale insects (almost whole superfamily Coccoidea) and aphids of the tribe Tramini (Lachnidae) demonstrate specific heterochromatinization of part of chromosomes in their diploid set. The species of scale insects with Lecanoid, Comstockioid, and Diaspidoid genetic systems feature obligate heterochromatinization of the paternal set of chromosomes in the males (Fig. 2e–f). Paternal genome heterochromatinization (PGH) is known in some groups of insects (see reviews of White 1973 and Normark 2003), but in each of these groups PGH has specific characters and forms unique genetic systems. The coccid species with systems Lecanoid, Comstockioid, and Diaspidoid can be purely sexual with identical male and female gametes, or demonstrate diploid arrhenotoky and deuterotoky in addition to heterochromatinization of the paternal set of chromosomes. In all these cases the sex of the progeny depends on rather enigmatic physiological processes occurring inside the female, as in the Aphidoid system.

In the Lecanoid system, the heterochromatic chromosome set exists during all stages of the male life cycle. During meiosis in the male, the chromosomes do not pair and separate equationally during the first division. During the second division, two metaphase plates are formed, and the heterochromatic and euchromatic chromosomes then segregate to the opposite poles (Hughes-Schrader 1948, Nur 1980). As a result of meiosis, quadrinucleate spermatids are formed, but only the nuclei of maternal origin produce sperm (Fig. 3).

In the Comstockioid system, the heterochromatic set is partly (as separate chromosomes) eliminated during embryogenesis and different cells of the same tissue may differ in chromosome number. According to the number of eliminated chromosomes, several variants of the Comstockiella system are known: CL^{I} – Comstockioid-Lecanoid intermediates, C^{varH} – Comstockioid with one pair of paternal chromosomes, retained in different cysts, C^{C} – complete Comstockioid. The course of spermatogenesis varies among the different taxa, depending on the number of non-eliminated heterochromatic chromosomes. If all these chromosomes are destroyed, the second division is absent (Brown 1965, 1967, Nur 1980).

In the Diaspidoid system, the heterochromatic set has been completely lost, and adult males are haploid. Hence, spermatogenesis consists of a single equational division (Brown 1965, 1967, Nur 1980, 1982).

In the aphid tribe Tramini (Lachnidae), almost all studied populations reproduce by thelytokous parthenogenesis and sex chromosomes have not been identified (Blackman 1980, 1990, Blackman et al. 2000). Some of the chromosomes in the diploid

set demonstrate heterochromatinization and even aggregation of heterochromatic elements in somatic cells until late prophase (Blackman 1980), thus resembling the Lecanoid-Comstockioid genetic system in scale insects. However, heterochomatic chromosomes in Tramini can vary significantly in number between populations and do not constitute a haploid set. These heterochromatic elements of Tramini are similar to B-chromosomes, and Blackman et al. (2000) suggest that they may be derived from ancestral redundant X chromosomes.

In the tribe Fordini (Aphidinea: Eriosomatidae), germ-line and somatic cells have radically different chromosome numbers (Blackman 1980). Unfortunately this very interesting phenomenon has not been additionally studied.

Hermaphroditism and *Haplo-diploidy* are known only in species of the tribe Iceryini (Coccinea: Margarodidae) (Hughes-Schrader 1948, 1963). The hermaphrodites are diploid and similar to females in their morphology and mode of life. During embryogenesis the gonads of these insects do not undergo sexual differentiation. Later, in the crawlers, haploid nuclei appear in the gonads and form the central testicular part of a hermaphroditic gland. The haploid nuclei appear as a result of degeneration and elimination of one set of chromosomes. The peripheral ovarian part of the gland is diploid and formed a little later. Fertilization takes place either in the ovarian part or in the cavity of the ovo-testis. Fertilized eggs always develop into female-like hermaphrodites, which usually reproduce by self-fertilization. However, the hermaphrodites may also copulate with accidental haploid males, which sometimes develop from unfertilized eggs (Hughes-Schrader 1948). *Haplo-diploidy* is known in Iceryini scale insects only and is in fact a result of haploid arrhenotoky as in other insects with haploid males. Fertilized eggs produce diploid females and unfertilized eggs produce haploid males (Hughes-Schrader 1948).

To date, species with heteromorphic sex chromosomes (genetic system XX/XY, neo-XX/XY) have not been found among Aphidococca in contrast to larger groups of Paraneoptera: Cicadinea + Heteroptera, where these systems are very common and to Psyllinea + Copeognatha, where XX/XY (or neo-XX/XY) system is known in several species. On the other hand, in some species of scale insects, such as *Newsteadia* sp., *Praelongorthezia praelonga* (Douglas, 1891) (both from Ortheziidae), *Lachnodius eucalypti* (Maskell, 1892) (Eriococcidae), and *Stictococcus* sp. (Stictococcidae), both females and males have the same number of chromosomes, but without distinct sex chromosomes or peculiar heterochromatinization of the paternal set (as in the unique coccid systems Lecanoid, Comstockioid, and Diaspidoid). Thus, the Australian felt scale *Lachnodius eucalypti*, having 2n=18 in both females and males (Brown, 1967, 1977, Nur, 1980), is especially noteworthy. In other studied species of the genus *Lachnodius* Maskell, 1896 and in the family Eriococcidae as a whole, the Comstockioid system has been discovered, but in males of *L. eucalypti* heterochromatinization of the paternal set is absent. The 2n-2n system probably evolved in scale insects more than once and from different ancestral systems: from the system with heterochromatinization in *L. eucalypti* and *Stictococcus* sp. and from the XX-X0 system in *Praelongorthezia praelonga* (Nur 1980). Meiosis in *L. eucalypti* comprises one reductional division only (Brown and Chandra 1977), whereas in *P. praelonga* it comprises two divisions without an inverted meiotic sequence (Brown 1958).

Parthenogenesis

It seems that absolutely all aphid species and many scale insects can produce their progeny by parthenogenesis. In aphids the parthenogenesis can be cyclic (with alternation of thelytoky and deuterotoky – the apomorphic condition for Aphidinea) or anholocyclic (with continuous thelytoky). In scale insects no examples of cyclic parthenogenesis are known and parthenogenesis can be thelytokous, deuterotokous or arrhenotokous. On the other hand, there are probably a few obligatory thelytokous species of scale insects, such as *Protopulvinaria pyriformis* (Cockerell, 1894) and *Eupulvinaria peregrina* Borchsenius, 1953 (Gavrilov and Trapeznikova 2008), which never produce males in any population or geographical region. A great many species, often reported as thelytokous (see, for example, Nur 1990 for the review), in reality combine thelytokous reproduction with amphimixis, producing males amphimictically or parthenogenetically (diploid arrhenotoky and deuterotoky), and these males have, as usual for scale insects, paternal genome heterochromatinization. Some species variously manifest thelytokous and sexual lineages in different geographical regions or on different host plants (Nur 1990). Haploid arrenotoky (noted above for Icerini) is connected with haplo-diploidy and can be interpreted as facultative, rather than obligatory parthenogenesis.

Unfortunately it is impossible to say now exactly how many scale insects species are able to reproduce by parthenogenesis, and this ignorance hampers a detailed comparison of scale insects and aphids in this respect.

Conclusion

Finally we can underline the following parallel trends in the evolution of Aphidinea and Coccinea:

1) Low modal numbers of chromosomes.
2) Heterochromatinization of part of chromosomes.
3) Production of only two sperms instead of four from each primary spermatocyte.
4) Physiological sex determination.
5) "Larval" meiosis.
6) Widely distributed parthenogenesis.
7) Intraspecific chromosomal races (some of which may be cryptic species).

We consider that at least some of these tendencies may be regarded as additional taxonomic characters, which support the erection of Aphidococca as a higher category differing radically from other Homoptera and more widely from all Paraneoptera groups.

A comparison of cytogenetic data between the two groups of Aphidococca shows that Coccinea demonstrate much more diverse cytogenetic characteristics than Aphidinea. From the cytogenetic point of view Coccinea seem to be more primitive, including specialized (in most families) as well as ancient plesiomorphic characters (in

some families): a simple XX-X0 genetic system with production of 4 sperms from one primary spermatocyte, chromosomal (not physiological) sex determination, simple bisexual reproduction, and later initiation of meiosis, i.e. characters which have been lost completely in all studied aphids. This deduction contradicts the current interpretation of paleontological data (discussed in the Introduction). It is difficult to imagine that the diverse (and partly primitive) cytogenetic mechanisms of scale insects could have originated from the very specialised and unified Aphidoid genetic system. We therefore suppose that the ancient scale insects originated at least not later than ancient aphids. The contradiction with the paleontological record may be explained by the well-known incompleteness of this record and the very limited number of taxonomic characters for fossil groups (mainly wing venation in ancient Aphidococca), which results in a very subjective identification of fossil insects. Thus, for example, fossil Naibiidae were described by Shcherbakov (1990, 2007) as most ancient, four-winged scale insects, but the same group is considered to be aphids by some aphidologists (see, for example, Wojciechowski 1992). The Lower Jurassic *Mesococcus asiaticus* Becker-Megdisova, 1960, which demonstrates the unique facies of a neotenic scale insect female, was considered by the original author as an ancient scale insect, similar to modern Monophlebinae, but was excluded from scale insects (and not placed in any other group!) by Koteja 1990.

Table 4. Chromosome numbers and genetic systems of Aphidinea. **P(c)** – cyclic parthenogenesis, **P(o)** – obligatory parthenogenesis in anholocyclic species, **B** – additional chromosomes.

Taxon	Life cycle	2n ♀/♂	Genetic system, ♀/♂	References and collecting data
Superfam. PHYLLOXEROIDEA Fam. Adelgidae				
Adelges geniculatus (Ratzeburg, 1844)	P(o)	20		Steffan 1968b [Germany; Canada]
A. laricis Vallot, 1836	P(c)	22, 21, 20/18	$2(X_1X_2X_3X_4)/X_1X_2X_3X_40$	Frolowa 1924 (as *Chermes strobilobius*) [Moscow, Russia]
		20/18	$2(X_1X_2)/X_1X_20$	Steffan 1968b [Germany]
A. tardus (Dreyfus, 1888)	P(o)	20		Steffan 1968b [Germany]
Aphrastasia pectinatae (Cholodkovsky, 1888)	P(c)	20/18	$2(X_1X_2)/X_1X_20$	Frolowa 1924 (as *Chermes*) [Moscow, Russia]
Cholodkovskya viridana (Cholodkovsky, 1888)	P(o)	24		Steffan 1968b [Germany]
Dreyfusia nordmannianae (Eckstein, 1890)	P(c)	22		Steffan 1968b [Germany]
Gillettella cooleyi (Gillette, 1907)	P(c)	22/20	$2(X_1X_2)/X_1X_20$	Steffan 1968a, b [Germany; Canada]
G. coweni (Gillette, 1907)	P(o)	22		Steffan 1968a, b [Canada]
Pineus boerneri Annand, 1928	P(o)	16		Blackman and Eastop 1994 [Hawaii, USA]
		17		Blackman and Eastop 1994 [California, USA; Africa; Australia; New Zealand]
P. cembrae (Cholodkovsky, 1888)	P(c)	18		Blackman and Eastop 1994 [?]

Taxon	Life cycle	2n ♀/♂	Genetic system, ♀/♂	References and collecting data
P. orientalis (Dreyfus, 1889)	P(c)	20		Blackman and Eastop 1994 [?]
P. pineoides (Cholodkovsky, 1903)	P(o)	17		Blackman and Eastop 1994 [?]
		22		Steffan 1968b [Germany; Canada]
P. pini (Goeze, 1778)	P(o)	19		Blackman and Eastop 1994 [New Zeland]
		20		Blackman and Eastop 1994, Blackman et al. 1995 [Europe]
		21		Blackman and Eastop 1994, Blackman et al. 1995 [Australia]
		22		Steffan 1968b [Germany]
P. similis (Gillette, 1907)	P(o)	22		Steffan 1968b [Canada]
P. strobi (Hartig, 1839)	P(o)	20		Blackman and Eastop 1994 [?]
		22		Steffan 1968b [Germany; Canada]
P. (*Pineoides*) *pinifoliae* (Fitch, 1858)	P(c)	22		Steffan 1968b [Canada]
Sacchiphantes abietis (Linnaeus, 1758)	P(o)	18		Pagliai 1967 [Italy], Steffan 1968b [Germany]
		20		Steffan 1968b (as *S. laricifoliae* (Fitch, 1858)) [Canada; USA]
S. viridis (Ratzeburg, 1843)	P(c)	18/16	$2(X_1X_2)/X_1X_20$	Steffan 1968a, b [Germany]
Fam. Phylloxeridae				
Aphanostigma piri (Cholodkovsky, 1903)	P(c)	8		Wysoki and Swirsky 1970 [Israel]
Daktulosphaira vitifoliae (Fitch, 1851)	P(c), P(o)	10/9	XX/X0	Maillet 1957 [France]; Forneck et al. 1999 [Europe; USA]
Moritziella caryaefoliae (Fitch, 1856)	P(o)	8		Morgan 1909b (as *Phylloxera*) [USA]
Phylloxera caryaecaulis (Fitch, 1855)	P(c)	8/6	$2(X_1X_2)/X_1X_20$	Morgan 1909a, 1912, 1915 [USA]
Ph. caryaefallax Riley, 1875	?	12		Morgan 1909a, 1912, 1915 (as *Ph. fallax*) [USA]
Ph. caryaeglobuli Walsh, 1863	?	22		Morgan 1906, 1909b [USA]
Ph. depressa (Shimer, 1869)	?	6		Morgan 1909b [USA]
Ph. globosa (Shimer, 1867)	?	6		Morgan 1906, 1909b [USA]
Ph. quercus Boyer de Fonscolombe, 1834	P(c), P(o)	12/11	XX/X0	Maillet 1957 [France]
Ph. subelliptica (Shimer, 1869)	?	6		Morgan 1909b [USA]
Phylloxera sp.	?	12		Morgan 1906 [USA]
Superfam. APHIDOIDEA Fam. Eriosomatidae				
Aloephagus myersi Essig, 1950	P(c), P(o)	22		Blackman and Eastop 1984 [?]
Aploneura lentisci (Passerini, 1856)	P(c), P(o)	16		Blackman 1980 (as *Asiphum*) [Great Britain], Blackman and Spence 1996 [Great Britain]
Appendiseta robiniae (Gillette, 1907)	P(c)	10		Blackman and Eastop 1994 [?]
Baizongia pistaciae (Linnaeus, 1767)	P(c), P(o)	24		Blackman 1980 [Great Britain] (anholocyclic population)

Taxon	Life cycle	2n ♀/♂	Genetic system, ♀/♂	References and collecting data
Colopha compressa (Koch, 1856)	P(c), P(o)	16		Blackman 1980 [Great Britain]
C. kansugei (Uye, 1924)	P(o), ? P(c)	10		Blackman 1986 [Japan]
Colophina arma Aoki, 1977	P(c)	10 (female), 8 (male)	$2(X_1X_2)/X_1X_20$	Blackman 1986 [Japan]
C. clematicola (Shinji, 1922)	?P(c), P(o)	20		Blackman and Eastop 2015 [?]
C. clematis (Shinji, 1922)	P(c), P(o)	10 +B (female), 8+B (male)	$2(X_1X_2)/X_1X_20$	Blackman 1986 [Japan]
Epipemphigus imaicus (Cholodkovsky, 1912)	P(c)	18		Khuda-Bukhsh 1980, Khuda-Bukhsh and Pal 1983a [Garhwal, Uttarakhand, India]
E. niisimae (Matsumura, 1917)	P(c)	20		Blackman 1986 [Japan]
Eriosoma crataegi (Oestlund, 1887)	P(c)	12		Robinson and Chen 1969a [Canada]
E. lanigerum (Hausmann, 1802)	P(c), P (o)	12		Baehr 1908, 1909 (as *Schizoneura*) [Germany], Pagliai 1963 [Italy], Sun and Robinson 1966, Harper and MacDonald 1966, Robinson and Chen 1969a [Canada], Kulkarni and Kacker 1980 [India], Gautam and Verma 1982, Kulkarni 1984 [Shimla, Himachal Pradesh, India]
		12/11	XX/X0	Gautam and Verma 1983 [Shimla, Himachal Pradesh, India]
E. (*Mimaphidus*) *lanuginosum* (Hartig, 1839)	P(c)	10		Blackman and Eastop 1984 [?]
E. (*M.*) *patchiae* (Börner & Blunck, 1916)	P(c)	10		Blackman 1980 [Great Britain]
E. (*Schizoneura*) *auratum* Akimoto, 1983	P(c)	12		Blackman 1986 [Japan]
E. (*S.*) *grossulariae* (Schüle, 1887)	P(c)	10		Blackman and Eastop 1984 [?]
E. (*S.*) *harunire* Akimoto, 1983	P(c)	10		Blackman 1986 [Japan]
E. (*S.*) *japonicum* (Matsumura, 1917)	P(c)	10		Blackman 1986 [Japan]
E. (*S.*) *kashmiricum* Ghosh, Verma & Raychaudhuri, 1976	P(c)	12		Pal and Khuda-Bukhsh 1983 [Garhwal, Uttarakhand, India]
? E. (*S.*) *laciniatae* Pashtshenko, 1988	P(c)	16		Blackman and Eastop 1994 [?]
E. (*S.*) *longicornutum* Akimoto, 1983	P(c)	10		Blackman 1986 [Japan]
E. (*S.*) *moriokense* Akimoto, 1983	P(c)	10		Blackman 1986 [Japan]
E. (*S.*) *ulmi* (Linnaeus, 1758)	P(c)	10		Blackman and Eastop 1984 [Europe]
		12		Baehr 1908, 1909 (as *Schizoneura*) [Germany]
E. near *ulmi* (Linnaeus, 1758)	?	16		Chen and Zhang 1985a [Beijing area, China] (cited after Blackman and Eastop 2015)
E. (*S.*) *yangi* Takahashi, 1939	P(c)	10		Blackman 1986 [Japan]

Taxon	Life cycle	2n ♀/♂	Genetic system, ♀/♂	References and collecting data
Forda formicaria von Heyden, 1837	P(c), P(o)	20		Robinson and Chen 1969a [Canada], Blackman and Spence 1996 [Great Britain]
		18-20 (somatic cells) or 21-23 (germline cells)		Blackman 1987a [Great Britain; Czechoslovakia; Sicily, Italy; Cyprus; Israel; Iran; USA; Canada]
		21, 22, 23		Blackman 1980 [Great Britain; North America] (anholocyclic populations)
F. hirsuta Mordvilko, 1928	P(c), P(o)	18		Blackman 1980, 1987a [Iran]
F. marginata Koch, 1857	P(c), P(o)	17-20 (somatic cells) or 25-40 (germ line cells)		Blackman 1987a [Great Britain; Sicily, Italy; Cyprus; Israel; Iran; USA; Canada]
		24,25, 26, 27, 32		Blackman 1980 [Great Britain; North America] (anholocyclic populations)
		28		Robinson and Chen 1969a [Canada]
F. riccobonii (Stefani, 1899)	P(c)	18		Khuda-Bukhsh and Pal 1983b [Gharwal, Uttarakhand, India]
		30 (germ line cells)		Blackman 1980 (as *F. dactylidis* Börner, 1950) [Iran] (but see Blackman 1987a: "Dr. V. F. Eastop has re-examined it and considers it to be closer to *F. riccobonii* (Stefani)")
		18 (somatic cells) or 30 (germ line cells)		Blackman 1987a [Iran]
Formosaphis micheliae Takahashi, 1925	?P(o)	10		Blackman 1986 [Japan] (with structural heterozygosity)
Geoica lucifuga (Zehnter, 1897)	P(c), P(o)	14		Kulkarni 1984 [Darjeeling, West Bengal, India]
		18		Blackman and Eastop 1994 [?]
G. ?rungsi Davatchi & Remaudière, 1957	P(c)	18		Blackman and Eastop 2015 [?] (holocyclic populations on *Pistacia atlantica*)
G. setulosa (Passerini, 1860)	P(c), P(o)	20?, 24, 28, 31		Blackman 1980 [Great Britain] (anholocyclic populations)
		20		Blackman 1980 [Iran]
		20, 24		Blackman and Eastop 2015 [?] (from grass roots)
G. utricularia (Passerini, 1856)	P(c), P(o)	16, 17, 18?		Blackman 1980 (as *G. eragrostidis* (Passerini, 1860)) [Great Britain] (anholocyclic populations)
		18		Blackman 1980 (as *G. eragrostidis* (Passerini, 1860)) [Italy]*
Geoica ?wertheimae Brown & Blackman, 1994	P(c)	18		Blackman and Eastop 2015 [?] (holocyclic populations on *Pistacia palaestina*)

Taxon	Life cycle	2n ♀/♂	Genetic system, ♀/♂	References and collecting data
Geoica sp.	?	18		Blackman 1980 [Israel]
Gootiella tremulae Tullgren, 1925	P(c), ?P(o)	16		Blackman and Eastop 2015 [?]
Hemipodaphis persimilis Akimoto, 1983	P(c)	36		Blackman 1986 [Japan]
Kaltenbachiella elsholtriae (Shinji, 1936)	P(c)	32		Blackman 1986 [Japan]
K. japonica (Matsumura, 1917)	P(c)	16/15	XX/X0	Blackman 1986 [Japan]
		18/?		Akimoto 1985 [Japan]
K. pallida (Haliday, 1838)	P(c)	28		Blackman 1980 [Great Britain]
K. spinosa Akimoto, 1985	P(c)	18		Akimoto 1985 [Japan]
Melaphis rhois (Fitch, 1866)	P(c), P(o)	26		Blackman and Eastop 1994 [?]
Mordwilkoja vagabunda (Walsh, 1863)	P(c), ?P(o)	20		Harper and MacDonald 1966, Robinson and Chen 1969a [Canada]
Neoprociphilus aceris (Monell, 1882)	P(c), P(o)	14		Robinson and Chen 1969a [Canada]
Pachypappa marsupialis lambersi Aoki, 1976	P(c)	10		Blackman 1986 [Japan]
P. rosettei (Maxson, 1934)	P(c)	10		Robinson and Chen 1969a (as *Asiphum*) [Canada]
P. sacculi (Gillette, 1914)	P(c)	10		MacDonald and Harper 1965 (as *Asiphum*), Harper and MacDonald 1966 (as *Asiphum*) [Canada]
P. tremulae (Linnaeus, 1761)	P(c)	10		Kuznetsova and Shaposhnikov 1973 (as *Asiphum*) [St. Petersburg, Russia]
P. warshavensis (Nasonov, 1894)	P(c)	10		Blackman and Eastop 1994 [?]
Pachypappa sp.	?	10		Blackman 1980 (as *Asiphum*) [Iran] (from *Populus euphratica*)
Paracletus cimiciformis von Heyden, 1837	P(c), P(o)	16		Blackman 1980 [Israel]
Paracolopha morrisoni (Baker, 1919)	P(c), ?P(o)	10/8	$2(X_1X_2)/X_1X_20$	S. Akimoto, personal communication in Blackman 1986 (as *Colopha moriokaensis* (Monzen, 1923) [Japan], Blackman and Eastop 1994 [?]
Patchiella reaumuri (Kaltenbach, 1843)	P(c), P(o)	12		Colling, 1955 (as *Pachypappella*) [Great Britain]
Pemphigus borealis Tullgren, 1909	P(c)	20		Blackman and Eastop 1994 [?]
P. bursarius (Linnaeus, 1758)	P(c), P(o)	20		Baehr 1908, 1909 (as *P. pyriformis*) [Germany]
P. dorocola Matsumura, 1917	P(c)	20		Blackman 1986 [Japan]
P. fuscicornis (Koch, 1857)	P(o), ?P(c)	20/19	XX/X0	Kuznetsova and Shaposhnikov 1973 [Kiev, Ukraine], Kuznetsova 1974 [?]
P. immunis Buckton, 1896	P(c)	10		Pal and Khuda-Bukhsh 1982 [Srinagar, Jammu and Kashmir, India]
		20		Blackman and Eastop 2015 [?]
P. ?laurifolia Dolgova, 1973	P(c)	20		Blackman 1986 [Japan]

Taxon	Life cycle	2n ♀/♂	Genetic system, ♀/♂	References and collecting data
P. matsumurai Monzen, 1929	P(c)	12		Chen and Zhang 1985a [Beijing area, China] (cited after Blackman and Eastop 2015), Blackman 1986 [Japan], Blackman and Eastop 1994 [?] ("an unusual chromosome number for a *Pemphigus*, confirmed for Japanese samples from *Thalictrum*").
P. microsetosus Aoki, 1975	P(c)	22		Blackman 1986 [Japan]
P. mordwilkoi Cholodkovsky, 1912	P(c)	20		Dutta and Gautam 1993 [Shimla, Himachal Pradesh, India], Blackman and Eastop 1994 [?]
P. passeki Börner, 1952	P(c)	22		Gut 1976 [Holland]
P. populicarius Fitch, 1859	P(c)	20		MacDonald and Harper 1965 [Canada]
P. populinigrae (Schrank, 1801)	P(c), ?P(o)	22		Gut 1976 (as *P. filaginis* (Boyer de Fonscolombe, 1841) [Holland]
P. populitransversus Riley, 1879	P(c), ?P(o)	20		Harper and MacDonald 1966 [Canada]
P. spyrothecae Passerini, 1856	P(c)	20		Baehr 1909 [Germany]
P. tartareus Hottes & Frison, 1931	P(c)	20		Robinson and Chen 1969a (as *P. junctisensoriatus* Maxson, 1934) [Canada]
Pemphigus sp.	?	20		Blackman 1980 [USA] (from roots of *Euphorbia supina*)
Prociphilus micheliae Hille Ris Lambers, 1933	?	14		Kar et al. 1990 [India]
P. osmanthae Essig & Kuwana, 1918	P(c)	18		Khuda-Bukhsh and Kar 1990 [Shillong, Meghalaya, India]
P. (*Meliarhizophagus*) *fraxinifolii* (Riley, 1879)	P(c)	20		Robinson and Chen 1969a [Canada]
		22		Blackman and Eastop 1994 [?]
P. (*Paraprociphilus*) *baicalensis* (Cholodkovsky, 1920)	P(o), ?P(c)	12		Blackman 1986 [Japan], Blackman and Eastop 1994 [?]
P. (*P.*) *tessellatus* (Fitch, 1851)	P(c)	6		Blackman and Eastop 1994 [?]
P. (*Stagona*) *konoi* Hori, 1938	P(c)	18		Blackman 1986 [Japan], Blackman and Eastop 1994 [?]
P. (*S.*) *pini* (Burmeister, 1835)	P(c)	16		Blackman 1980 [Great Britain]
P. (*S.*) *xylostei* (De Geer, 1773)	P(c)	10		Pal and Khuda-Bukhsh 1983 [Garhwal, Uttarakhand, India], Blackman and Eastop 2015 [Europe]
Prociphilus sp. 1	?	18		Khuda-Bukhsh and Kar 1990 [Shillong, Meghalaya, India]
Prociphilus sp. 2	?	10		Dutta and Gautam 1993 [Shimla, Himachal Pradesh, India]
Rectinasus buxtoni Theobald, 1914	P(c), P(o)	26		Blackman 1980 [Iran]
Schlechtendalia chinensis (Bell, 1851)	P(c)	c. 36		Blackman and Eastop 1994 [?]
Smynthurodes betae Westwood, 1849	P(c), P(o)	8		Blackman 1980 [Great Britain; Iran]

Taxon	Life cycle	2n ♀/♂	Genetic system, ♀/♂	References and collecting data
Tetraneura radicicola Strand, 1929	P(c), ?P(o)	14		Blackman and Eastop 1984 [?]
		14/13	XX/X0	S. Akimoto, personal communication in Blackman 1986 [Japan]
T. ulmi (Linnaeus, 1758)	P(c), P(o)	14/13	XX/X0	Schwartz 1932 [Munich, Germany]
		14, 16		Galli and Manicardi 1998 (gall generation) [Italy]
		16		Blackman and Eastop 1984 [?]
T. yezoensis Matsumura, 1917	P(c), P(o)	12/11	XX/X0	S. Akimoto, personal communication in Blackman 1986 [Japan]
		12		Blackman and Eastop 1994 [Japan]
		18		Chen and Zhang 1985a [Beijing area, China] (cited after Blackman and Eastop 2015)
T. (*Tetraneurella*) *fusiformis* Matsumura, 1917	P(c), P(o)	18/16	$2(X_1X_2)/X_1X_20$	S. Akimoto, personal communication in Blackman 1986 [Japan]
		18		Blackman and Eastop 2015 [?] (gall generation)
		17, 18, 19, 20		Blackman and Eastop 2015 [?] (permanently parthenogenetic populations)
T. (*T.*) *nigriabdominalis* (Sasaki, 1899)	P(c), P(o)	14		Kulkarni and Kacker 1981a (as *T. hirsuta* Baker) [Sukna, West Bengal, India], Kulkarni 1984 [Darjeeling, West Bengal, India]
		14, 15, 16		Gautam et al. 1993, Manicardi and Gautam 1994 (as *T. akinire*) [Modena, Italy]
		17		Blackman and Eastop 1984 [?] (one sample), Blackman and Eastop 1994 [?] (anholocyclic population)
		18		Chen and Zhang 1985a [Beijing area, China] (cited after Blackman and Eastop 2015), Blackman 1986 [Japan]
		13-19 with modal number 18	XX/X0	Galli and Manicardi 1998 (gall generation) [Italy]
		19		Blackman and Eastop 1994 [?] (anholocyclic population)
T. (*T.*) sp. 1 prope *nigriabdominalis* (Sasaki, 1899)	?	24		Blackman 1986 [Japan]
T. (*T.*) sp. 2 prope *nigriabdominalis* (Sasaki, 1899)	?	22, 26		S. Akimoto, personal communication in Blackman 1986 [Japan]
T. (*T.*) *sorini* Hille Ris Lambers, 1970	P(c)	16/14	$2(X_1X_2)/X_1X_20$	S. Akimoto, personal communication in Blackman 1986 [Japan]
Tetraneura sp.	?	10		Chen and Zhang 1985a [Beijing area, China] (cited after Blackman and Eastop 2015)

Taxon	Life cycle	2n ♀/♂	Genetic system, ♀/♂	References and collecting data
Thecabius affinis (Kaltenbach, 1843)	P(c), P(o)	28		MacDonald and Harper 1965 (as *Th. populiconduplifolius* (Cowen, 1895)), Harper and MacDonald 1966 (as *Th. populiconduplifolius*) [Canada]
		38		Blackman 1980 [Great Britain], Blackman 1986 (as *Thecabius orientalis* (Mordvilko, 1935)) [Japan], Blackman and Eastop 2006 [British Columbia, Canada]
T. (*Parathecabius*) *auriculae* (Murray, 1877)	?	16		Blackman and Eastop 2006 [?]
T. (*P.*) *latisensorius* (Hori, 1938)	P(c)	18+1 (1 B-chromosome?)		Blackman 1986 (as *Thecabius*) [Japan]
T. (*P.*) *lysimachiae* Börner, 1916	P(c), P(o)	18		Gut 1976 [Holland]
Fam. Mindaridae				
Mindarus abietinus Koch, 1857	P(c)	12		Robinson and Chen 1969a [Canada], Blackman and Eastop 1994 [Europe]
M. obliquus (Cholodkovsky, 1896)	P(c)	8		Blackman and Eastop 1994: [?] (sample from *P. glauca* in British Columbia, Canada (leg. C.K. Chan) had 2n=8 (R.L. Blackman; unpublished data), indicating that there may be more than one species on *Picea* in Canada)
		12		Robinson and Chen 1969a [Canada]
Fam. Lachnidae				
Cinara atlantica (Wilson, 1919)	P(c), P(o)	10		Blackman and Eastop 1994 [?]
C. atrotibialis David & Rajasingh, 1968	?P(o)	10		Khuda-Bukhsh and Kar 1990 [Shillong, Meghalaya, India]
		22		Das et al. 1985 [India]
C. braggii (Gillette, 1917)	P(c)	10		Sun and Robinson 1966, Robinson and Chen 1969a [Canada]
C. cedri Mimeur, 1936	P(c)	10		Blackman and Eastop 1994 [?]
C. cembrae (Seitner, 1936)	P(c)	10		Rukavischnikov 1979 [Siberia, Russia]
C. coloradensis (Gillette, 1917)	?	10		Robinson and Chen 1969a [Canada]
C. confinis (Koch, 1856)	P(c), P(o)	12		Blackman and Eastop 1994 [?]
C. costata (Zetterstedt, 1828)	P(c)	10		Blackman and Eastop 1994 [?]
C. cronartii Tissot & Pepper, 1967	?P(o)	10		Blackman and Eastop 1994 [?]
C. cuneomaculata (del Guercio, 1909)	P(c)	10/9		Shinji 1931 (as *Dilachnus laricis* (Walker, 1848)) [Japan]
C. formosana (Takahashi, 1924)	P(c)	10		Blackman and Eastop 1994 [?]
C. fornacula Hottes, 1930	P(c)	10		Robinson and Chen 1969a [Canada]
C. hyperophila (Koch, 1855)	P(c)	10		Rukavischnikov 1974, 1979 [Novosibirsk, Russia]
C. kochiana (Börner, 1939)	P(c)	10		Rukavischnikov 1974, 1979 (as *C. boerneri* Hille Ris Lambers, 1956 - see Mamontova 1991) [Novosibirsk, Russia], Blackman 1980 [Great Britain]
C. lachnirostris Hille Ris Lambers, 1966	?	8		Dutta and Gautam 1993 [Shimla, Himachal Pradesh, India]
C. laricicola (Matsumura, 1917)	P(c)	10		Shinji 1927 (as *Dilachnus laricolus*), 1931, 1941a (as *C. laricis*), Blackman 1986 [Japan]
C. laricifex (Fitch, 1858)	P(c)	10		Robinson and Chen 1969a [Canada]

Taxon	Life cycle	2n ♀/♂	Genetic system, ♀/♂	References and collecting data
C. laricis Hartig 1839	P(c)	10		Rukavischnikov 1979 [Siberia, Russia]
C. maculipes Hille Ris Lambers, 1966	P(c)	12		Das et al. 1985 [Jammu and Kashmir, India], Kurl and Chauhan 1986a, 1987a [Chail, Himachal Pradesh , India]
C. maghrebica Mimeur, 1934	?	10		Blackman and Eastop 1994 [?]
C. matsumurana Hille Ris Lambers, 1966	P(c)	10		Blackman 1986 [Japan]
C. nuda Mordvilko, 1895	P(c)	10		Rukavischnikov 1974, 1979 [Novosibirsk, Russia]
C. palaestinensis Hille Ris Lambers, 1948	?P(o)	10		Blackman and Eastop 1994 [?]
C. pectinatae (Nördlinger, 1880)	P(c)	6		Blackman and Eastop 1994 [Germany] (2 samples) (about record of Rukavishnikov 1979 see *Cinara confinis* (Koch, 1856))
C. pergandei (Wilson, 1919)	P(c)	14		Blackman 1990 [?], Blackman and Eastop 1994 [?]
C. piceae (Panzer, 1801)	P(c)	10		Rukavischnikov 1979 (as *C. piceae* (Panzer, 1801) and also as misidentification of *C. pectinatae* (Nördlinger, 1880)) – see Mamontova 1991) [Novosibirsk, Russia], Blackman and Eastop 1994 [Great Britain]
C. piceicola (Cholodkovsky, 1896)	P(c)	8		Blackman 1990 [?], Blackman and Eastop 1994 [?]
C. pilicornis (Hartig, 1841)	P(c)	10		Blackman 1990, Blackman and Eastop 1994 [Great Britain; New Zeland]
		14		Rukavischnikov 1974, 1979 [Novosibirsk, Russia]
C. pilosa (Zetterstedt, 1840)	?	8		Blackman 1990 [?], Blackman and Eastop 1994 [?] (Mamontova 2001 noted 2n=14 accoring to Rukavischnikov 1979, but the last paper does not consider *C. pilosa* in reality)
C. pinea (Mordvilko, 1895)	P(c)	10		Sun and Robinson 1966 , Robinson and Chen 1969a [Canada]
		10, 11, 14		Blackman 1990 [Great Britain]
		14		Rukavischnikov 1974, 1979 [Novosibirsk, Russia]
C. pini (Linnaeus, 1758)	P(c)	10/9	XX/X0	Rukavischnikov 1974, 1979 (as *C. pini* (Linnaeus, 1758) and as *C. hyperophila* (Koch, 1855) – see Mamontova 1991) [Novosibirsk, Russia], Blackman 1986 [Europe]
C. pinidensiflorae (Essig & Kuwana, 1918)	P(c)	10		Blackman and Eastop 2015 [?]
		22/21	XX/X0	Shinji 1931 (as *Dilachnus*), Blackman 1986 [Japan] (based on n(♂) = 11(Shinji 1931))
C. piniformosana (Takahashi, 1923)	P(c)	10		Blackman 1986 [Japan]
C. pinimaritimae (Dufour, 1833)	P(c), ?P(o)	16		Blackman 1990, Blackman and Eastop 1994 (as *C. maritimae*) [?]
C. ponderosae (Williams, 1911)	P(c), P(o)	10		Blackman 1980 [USA]
C. pruinosa (Hartig, 1841)	P(c), P(o)	10		Blackman and Eastop 1994 [?]
C. schimitscheki Börner, 1940	P(c)	10		Blackman and Eastop 1994 [?]

Taxon	Life cycle	2n ♀/♂	Genetic system, ♀/♂	References and collecting data
C. similis (van der Goot, 1917)	?	12		Kulkarni and Kacker 1981a (as *Lachnus*) [Dadhau, Himachal Pradesh, India]
C. strobi (Fitch, 1851)	P(c)	10		Blackman and Eastop 1994 [?]
C. tenuipes Chakrabarti & Ghosh, 1974	?	12		Pal and Khuda-Bukhsh 1982 (as *C. abieticola tenuipes* Chakrabarti and Ghosh) [Srinagar, Jammu and Kashmir, India] (probably misidentification – aphids were collected from unusual host plant, *Juniperus communis*)
C. (*Cupressobium*) *cupressi* (Buckton, 1881)	P(c), P(o)	12		Blackman 1980 [Great Britain]
C. (*C.*) *fresai* Blanchard, 1939	P(o)	13		Blackman 1980 [Great Britain]
C. (*C.*) *juniperi* (de Geer, 1773)	P(c)	12		Blackman 1980 [Great Britain]
C. (*C.*) *louisianensis* Boudreaux, 1949	?	12		Blackman 1990 [?]
C. (*C.*) *tujafilina* (del Guercio, 1909)	P(c)	12		Blackman 1980 [USA; Iran], Das et al. 1985 [India], Dutta and Gautam 1993 [Shimla, Himachal Pradesh, India]
Essigella californica (Essig, 1909)	P(c), P(o)	8		Blackman 1980 [USA]
Eulachnus agilis (Kaltenbach, 1843)	P(c)	8		Rukavischnikov 1979 (as *Protolachnus*) [Novosibirsk, Russia], Blackman 1980 [Great Britain; Sweden]
E. brevipilosus Börner, 1940	?P(o)	30		Blackman 1980 [Great Britain]
E. rileyi (Williams, 1911)	P(c), ?P(o)	8		Blackman 1980 [USA; Iran]
E. thunbergii (Wilson, 1919)	P(c)	8		Khuda-Bukhsh and Kar 1990 [Shillong, Meghalaya, India]
		14/13	XX/X0	Shinji 1927, 1931 (as *E. piniformosanus* Takahashi, 1931), Blackman 1986 [Japan] (based on n(♂) = 7 (Shinji 1927, 1931))
E. tuberculostemmatus (Theobald, 1915)	?	8		Blackman 1986 [Europe], Khuda-Bukhsh and Kar 1990 (cited after Blackman and Eastop 2015)
Lachnus acutihirsutus Kumar et Burkhardt, 1970	?	16		Dutta and Gautam 1993 [Shimla, Himachal Pradesh, India]
L. longirostris (Mordvilko, 1909)	P(c)	8		Blackman 1990 (as *L. iliciphilus*) [West Germany]
L. roboris (Linnaeus, 1758)	P(c)	7?	$2(X_1X_2)/X_1X_20$	Blackman 1990 [West Germany]
		8 (7+1B)		Blackman 1990 [Czechoslovakia; West Germany]
		9 (7+2B)		Blackman 1990 [Czechoslovakia; Denmark; Poland]
		10		Blackman 1990 [Portugal; Great Britain?]
		11 (10+1B)		Blackman 1990 [Sweden; Great Britain]
		12?		Blackman 1990 [Portugal]
		14		Blackman 1990 [Great Britain]
		15 (13+ 2B?), 16, 17?		Blackman 1990 [Portugal]
		7, 8, 10, 11, 13, 16 and17		Blackman and Eastop 2015 [?] (some of these may apply to *L. iliciphilus*; a sample from *Castanea* in Portugal had 2n=10 (Blackman 1990))

Taxon	Life cycle	2n ♀/♂	Genetic system, ♀/♂	References and collecting data
L. tropicalis (van der Goot, 1916)	P(c), ?P(o)	10	XX/X0	Shinji 1927, 1941a (as *Pterochlorus*), Blackman 1986 [Japan] (based on n(♂) = 5 (Shinji 1927))
		16		Shinji 1931 (as *Pterochlorus*) [Japan], Blackman 1986 [Japan] (based on n(♂) = 8 (Shinji 1931))
		12, 13 or 16		Blackman 1986, 1990 [Japan; China]
		12, 14, 16, 18, 22, 28, 38		Muramoto 1987 [Japan] (Blackman and Eastop 2015: " Muramoto (1987) reported chromosome numbers from 2n=14-38, but his results are difficult to interpret and may include polyploid cells and/or preparations of more than one species.")
Maculolachnus sijpkensi Hille Ris Lambers, 1962	P(c)	10		Robinson and Chen 1969a [Canada]
M. submacula (Walker, 1848)	P(c)	10		Blackman 1980 [Great Britain], Blackman and Spence 1996 [Great Britain]
		10/9	XX/X0	Blackman 1990 [Great Britain]
Protrama flavescens (Koch, 1857)	P(o)	40-42, c. 42		Blackman 1980 [Great Britain]
		~ 42, 42		Blackman et al. 2000 [Great Britain]
P. radicis (Kaltenbach, 1843)	P(o)	c.60		Blackman 1980 [Great Britain]
		~ 50		Blackman et al. 2000 [Great Britain]
P. ranunculi (del Guercio, 1909)	?	c.36		Blackman 1980 [Great Britain]
Pterochloroides persicae (Cholodkovsky, 1899)	P(c), P(o)	20		Blackman and Eastop 1984 [?], Blackman 1990 [?]
Schizolachnus pineti (Fabricius, 1781)	P(c), ?P(o)	10		Blackman 1980 [Great Britain]
		18		Rukavischnikov 1974, 1979 [Novosibirsk, Russia] (Blackman and Eastop 2015 supposed that the material from Novosibirsk may be misidentification of *S. obscurus*)
Stomaphis bratislavensis Czylok & Blackman, 1991	P(c)	8		Blackman 1990 (as *Stomaphis quercus* (Linnaeus, 1758)) [Czechoslovakia], Czylok and Blackman 1991 [Slovakia]
S. cupressi (Pintera, 1965)	?	14		Blackman 1990 [?]
S. japonica Takahashi, 1960	P(c)	10/8	$2(X_1X_2)/X_1X_20$	Blackman 1986 [Japan], Blackman 1990 [?], Czylok and Blackman 1991 [Japan]
S. quercus (Linnaeus, 1758)	P(c)	10/8	$2(X_1X_2)/X_1X_20$	Blackman 1990 [Europe]
S. yanonis Takahashi, 1918	P(c)	15, 16?	$2(X_1X_2)/X_1X_20$	Blackman 1990 [?]
		20?	$2(X_1X_2)/X_1X_20$	Honda 1921 (as *S. janonis*), Blackman 1986 [Japan] (based on n(♂) = 10 (Honda 1921))
Trama rara Mordvilko, 1908	?	12		Blackman et al. 2000 [Great Britain]
		12, 13,14		Normark 1999 [Great Britain; Poland]
		13		Blackman 1980 [Great Britain]
T. troglodytes von Heyden, 1837	P(o), P(c)	13, 14, 16, 17, 18, 19, 20, 21, 23		Normark 1999 [Great Britain; France; Germany; Czech Republic; Poland]

Taxon	Life cycle	2n ♀/♂	Genetic system, ♀/♂	References and collecting data
		14, 15, 16, 17, 18, 19, 20, 21, 22		Blackman 1980 [Great Britain]
		14, 15, 17, 18, 19, 20, 21,22, 23		Blackman et al. 2000 [Great Britain]
		16		Blackman et al. 2000 [Poland]
		16 (colony without sexual morphs), 20 (colonie swith sexual morphs)		Blackman et al. 2001 [Great Britain]
		21		Blackman and Spence 1996 [Great Britain]
T. (*Neotrama*) *caudata* del Guercio, 1909	P(o)	9, 11		Blackman 1980 (as *Neotrama*) [Great Britain]
		9, 10, 11,12		Blackman et al. 2000 [Great Britain]
		10, 12		Normark 1999 [Great Britain]
T. (*N.*) *maritima* (Eastop, 1953)	P(o)	10, 11, 12, 13, 14		Normark 1999, Blackman et al. 2000 [Great Britain]
Tuberolachnus salignus (Gmelin, 1790)	P(o)	8		Morgan 1909b (as *Lachnus dentatus* Le Baron, 1872) [USA], Shinji 1927, 1931, 1941a (as *Tuberolachnus viminalis* (Fonscolombe)) [?] (based on n(♂) = 4 (Shinji 1927, 1931, 1941a), but Blackman 1980 supposed that all these data are misidentifications of different species of *Pterocomma*).
		20		Blackman 1986 [Japan], Blackman 1990 [Great Britain; Iran; India; Japan], Blackman and Spence 1996 [Great Britain]
		18,19,20		Dhatwalia and Gautam 2009 [Himachal Pradesh, India]
		22		Raychaudhuri and Das 1987 [India]
Fam. Hormaphididae				
Aleurodaphis asteris Takahashi & Sorin, 1958	P(o)	32		Blackman 1986 [Japan]
A. impatientis Sorin & Miyazaki, 2004	P(o)	c.30		Blackman and Eastop 2006 [?]
A. mikaniae Takahashi, 1925	?	c.30		Blackman 1986 [Japan]
Astegopteryx bambusae (Buckton, 1893)	?	12		Kar et al. 1990 [India]
A. formosana (Takahashi, 1924)	?	12		Chen and Zhang 1985b (as *A. insularis*) (cited after Blackman and Eastop 2015)
A. himalayensis (M.R. Ghosh, Pal & D.N. Raychaudhuri, 1977)		12		Kar et al. 1990 (as *Pseudoastegopteryx*) [India]
A. minuta (van der Goot, 1917)	?	12		Kar et al. 1990 [India]
Cerataphis brasiliensis (Hempel, 1901)	P(c), P(o)	18		Blackman and Eastop 2006 [?]
C. orchidearum (Westwood, 1879)	P(o)	16		Blackman and Eastop 1984, 2006 [?] (samples from *Cymbidium*, *Dendrobium* and *Epidendrum*)
		18		Blackman and Eastop 1984, 2006 [?] (samples from *Angraecum*, *Sarcochilus* and *Butia*)

Taxon	Life cycle	2n ♀/♂	Genetic system, ♀/♂	References and collecting data
Ceratoglyphina bambusae van der Goot, 1917	P(c)	12		Chen and Zhang 1985a [Beijing area, China] (cited after Blackman and Eastop 2015)
C. bengalensis L.K. Ghosh, 1972	?	12		Khuda-Bukhsh and Kar 1987 (as *C. bambusae bengalensis* Ghosh) [Kalimpong, West Bengal, India]
Ceratovacuna indica M.R. Ghosh, Pal & D.N. Raychaudhuri, 1977	?	12		Kar et al. 1990 [India]
C. japonica (Takahashi, 1924)	P(c), P(o)	12		Blackman 1986 [Japan]
C. lanigera Zehntner, 1897	P(o)	12		Blackman and Eastop 1984 [?], Blackman 1986 [Japan], Kar et al. 1990 [India]
C. nekoashi (Sasaki, 1910)	P(c)	12		Blackman 1986 [Japan]
C. perglandulosa R.C. Basu, A.K. Ghosh & D.N. Raychaudhuri, 1975	?	12		Khuda-Bukhsh and Kar 1987 [Kalimpong, West Bengal, India]
C. silvestrii (Takahashi, 1927)	?	8		Kurl 1980b [Meghalaya, India]
		12		Khuda-Bukhsh and Kar 1987 [Kalimpong, West Bengal, India]
Euthoracaphis umbellulariae (Essig, 1932)	?P(c), P(o)	14		Blackman 1980 [USA]
Hamamelistes betulinus (Horvath, 1896)	P(o), P(c)	12		Kuznetsova and Shaposhnikov 1973 (as *Tetraphis*) [St. Petersburg, Russia], Blackman 1986 [Japan], Blackman and Eastop 2015 [?] (for anholocyclic European population)
H. spinosus Shimer, 1867	P(c)	c. 50		Blackman 1980 [Canada], Blackman and Eastop 1994 [?]
Hormaphis betulae (Mordvilko, 1901)	P(o), P(c)	?18		Blackman 1986 [Japan]
H. cornu (Shimer, 1867)	P(c)	?18		Blackman and Eastop 1994 [?]
H. hamamelidis (Fitch, 1851)	P(c)	?18		Blackman and Eastop 1994 [?]
Pseudoregma alexanderi (Takahashi, 1924)	P(o), ?P(c)	12		Khuda-Bukhsh and Kar 1987 (as *Paraoregma*) [Kalimpong, West Bengal, India]
P. bambucicola (Takahashi, 1921)	P(c), P(o)	12		Blackman 1986 [Japan], Chen and Zhang 1985b (cited after Blackman and Eastop 2015), Khuda-Bukhsh and Kar 1987 [Kalimpong, West Bengal, India]
P. panicola (Takahashi, 1921)	P(o)	12		Blackman 1986 [Japan]
Thoracaphis sp.	?	12		Blackman 1980 [Japan]
Fam. Thelaxidae				
Glyphina betulae (Linnaeus, 1758)	P(c)	10/9	XX/X0	Kuznetsova and Shaposhnikov 1973 [St. Petersburg, Russia]
		28/27, 56/55	XX/X0	Blackman 1989 [Poland; Great Britain; Lithuania]
G. jacutensis Mordvilko, 1931	P(c)	8		Blackman 1989 [Romania; Lithuania]
		10		Kuznetsova and Shaposhnikov 1973 (as *G. schrankiana* Börner, 1950) [St. Petersburg, Russia]
G. pseudoschrankiana Blackman, 1989	P(c)	10/9	XX/X0	Blackman 1989 [Great Britain, Sweden]
Glyphina sp. from *Betula*	?	55		Blackman 1980 [Great Britain]
Kurisakia onigurumii (Shinji, 1923)	?P(c)	18		Blackman and Eastop 1994 [?] (or specimens from *Pterocarya stenoptera* in China)

Taxon	Life cycle	2n ♀/♂	Genetic system, ♀/♂	References and collecting data
Thelaxes californica (Davidson, 1919)	P(c)	12		Blackman and Eastop 1994 [?]
T. dryophila (Schrank, 1801)	P(c)	8		Kuznetsova and Shaposhnikov 1973 [St. Petersburg, Russia], Kuznetsova 1974 [?]
T. suberi (del Guercio, 1911)	?	8		Blackman and Eastop 1984 [?]
T. valtadorosi Remaudière, (1982) 1983	?	8		Blackman and Eastop 1994 [?]
Fam. Aiceonidae				
Aiceona retipennis David, Narayanan & Rajasingh, (1970) 1971	?	18		Khuda-Bukhsh 1980 [Garhwal, Uttarakhand, India]
Fam. Anoeciidae				
Anoecia corni (Fabricius, 1775)	P(c), P(o)	6		Blackman and Eastop 2015 [?]
		6, 7, 8 (rearrangements, hybridization?)		Blackman 1980 [Great Britain; Iran]
		8		Dutta and Gautam 1993 [Shimla, Himachal Pradesh, India]
A. cornicola (Walsh, 1863)	P(c), P(o)	10		Robinson and Chen 1969a (as *A. querci* Fitch, 1859) [Canada]
A. furcata (Theobald, 1915)	P(o), ?P(c)	12		Gautam et al. 1993 [Modena, Italy]
		12, 13		Blackman 1980 (as *A. furcata* (Theobald, 1915) and as *A. nemoralis* Börner, 1950) [Great Britain]
A. graminis Gillette & Palmer, 1924	P(c)	8		Sun and Robinson 1966, Robinson and Chen 1969a [Canada]
A. haupti Börner, 1950	P(c)	8		Blackman and Eastop 2015 [?]
A. major Börner, 1950	P(c)	7		Blackman 1980 [Great Britain] (2n=7 in possible hybrids with *corni*), Blackman and Eastop 2006 [?]
		8		Blackman 1980 [Great Britain], Blackman and Eastop 2006 [?]
A. vagans (Koch, 1856)	P(c)	12		Blackman 1980 [Great Britain; Sweden]
Anoecia sp. prope *haupti* Börner, 1950	?	8		Kuznetsova and Shaposhnikov 1973 [Crimea, Ukraine], Kuznetsova 1974 [?]
Fam. Phloeomyzidae				
Phloeomyzus passerinii Signoret, 1875	P(c), P(o)	10		Gut 1976 [Holland]
Fam. Greenideidae				
Anomalosiphum indigoferae A.K. Ghosh, M.R. Ghosh & D.N. Raychaudhuri, 1971	?	18		Blackman 1980 [Sarawak, Malaysia]
Cervaphis quercus Takahashi, 1918	?	8		Kurl 1980b [Meghalaya, India], Blackman 1986 [Japan]
C. rappardi indica A.N. Basu, 1961	?	8		Kar et al. 1990 [India]
Eutrichosiphon heterotrichum (Raychaudhuri, 1956)	P(c), P(o)	20		Blackman 1986 (as *E. dubium*) [Japan] (see Blackman and Eastop 2015)
E. makii Raychaudhuri & Chatterjee, 1974	?	40		Khuda-Bukhsh and Kar 1990 [Shillong, Meghalaya, India]
E. parvulum Eastop & Hille Ris Lambers, 1976	?	26		Blackman and Eastop 2006 [?]
Eutrichosiphum sp.	?	20		Dutta and Gautam 1993 [Shimla, Himachal Pradesh, India]

Taxon	Life cycle	2n ♀/♂	Genetic system, ♀/♂	References and collecting data
Greenidea ayyari D.N. Raychaudhuri, M.K. Ghosh, Banerjee, A.K. Ghosh, 1973	?	18		Gautam and Kumar 2006 [Shimla, Himachal Pradesh, India]
G. ficicola Takahashi, 1921	P(o)	22		Blackman 1980 [Australia]
G. longisetosa Raychaudhuri, Ghosh, Banerjee & Ghosh, 1973	?	18		Khuda-Bukhsh and Kar 1990 [Shillong, Meghalaya, India]
G. mangiferae Takahashi, 1925	?	20		Chen and Zhang 1985b (cited after Blackman and Eastop 2015)
G. querciphaga Raychaudhuri, Ghosh, Banerjee & Ghosh., 1973	?	18		Gautam and Kumar 2006 [Shimla, Himachal Pradesh, India]
G. (*Trichosiphum*) *anonae* (Pergande, 1906)	?P(o), ?P(c)	22		Khuda-Bukhsh and Kar 1990 [Shillong, Meghalaya, India]
G. (*T.*) *bucktonis* A.K. Ghosh, R.C. Basu & D.N. Raychaudhuri, 1970	?	8		Kar et al. 1990 (as *G.* (*T.*) *schoutedeni* Raychaudhuri, Ghosh, Banerjee and Ghosh) [India]
		14		Kapoor and Gautam 1994 [Shimla, Himachal Pradesh, India]
G. (*T.*) *haldari* Maity & Chakrabarti, 1980	?	20		Gautam and Kumar 2006 [Shimla, Himachal Pradesh, India]
G. (*T.*) *heeri* D.N. Raychaudhuri, M.R. Ghosh, M. Banerjee & A.K. Ghosh, 1973	?	7, 8, 9		Kurl 1986 (as *G.* (*T.*) *formosana heeri* D.N. Raychaudhuri, M.R. Ghosh, M. Banerjee & A.K. Ghosh, 1973) [Meghalaya, India]
G. (*T.*) *kuwanai* (Pergande, 1906)	?P(c)	20		Blackman 1980, 1986 [Japan], Gautam and Kumar 2006 [Shimla, Himachal Pradesh, India]
G. (*T.*) *nipponica* Suenaga, 1934	P(c)	18		Blackman 1986 [Japan]
G. (*Trichosiphum*) *psidii* van der Goot, 1917	P(o)	18		Kulkarni and Kacker 1979 (as *G.* (*T.*) *formosana formosana* (Maki) [Rautara, West Bengal, India], Kar et al. 1990 (as *G.* (*T.*) *formosana formosana* (Makiischout)) [India], Khuda-Bukhsh and Kar 1990 (as *G.* (*T.*) *formosana formosana* (Maki, 1917)) [Shillong, Meghalaya, India], Dutta and Gautam 1993 (as *G.* (*T.*) *formosana* (Maki, 1917)) [Mandi, Himachal Pradesh, India], Samkaria et al. 2010 (as *G. formosana* (Maki)) [Palampur, Himachal Pradesh, India]
Mollitrichosiphum nandii A.N. Basu, 1964	P(c)	16		Blackman and Eastop 1994 [?]
Schoutedenia ralumensis Rübsaamen, 1905	P(c), P(o)	14 (male)		Blackman 1980 [Australia]
		14		Khuda-Bukhsh and Kar 1990 (as *S. lutea* (van der Goot, 1917)) [Kalyani, West Bengal, India]
		15(sex unknown)		Blackman and Eastop 1994 [Papua New Guinea]
		16/14	$2(X_1X_2)/X_1X_20$	Hales 1989 (as *S. lutea* (van der Goot)) [Australia]
Fam. Drepanosiphidae				
Allaphis californica (Hille Ris Lambers, 1974)	?	10		Blackman and Eastop 2006 (as *Thripsaphis*) [?]
A. foxtonensis (Cottier, 1953)	?	10		Blackman and Eastop 2006 (as *Thripsaphis*) [?]
A. verrucosa (Gillette, 1917)	P(c)	10		Blackman and Eastop 2006 (as *Thripsaphis*) [?]
Betacallis alnicolens Matsumura, 1919	?	22		Blackman 1986 [Japan]

Taxon	Life cycle	2n ♀/♂	Genetic system, ♀/♂	References and collecting data
B. odaiensis Takahashi, 1961	?	22		Blackman 1986 [Japan] provided these data and supposed that " *Euceraphis betulifoliae*" in Shinji 1927 (with n=11) is very possibly *B. odaiensis.*
B. sikkimensis R.C. Basu, M.R. Ghosh & D.N. Raychaudhuri,1974	P(c)	20		Khuda-Bukhsh and Pal 1983b [Gharwal, Uttarakhand, India]
Betulaphis brevipilosa Börner, 1940	P(c)	20		Blackman and Eastop 1994 [?]
B. pelei Hille Ris Lambers, 1952	?	20		Blackman and Eastop 1994 [?]
B. quadrituberculata (Kaltenbach, 1843)	P(c)	20		Blackman 1980 [Sweden]
Boernerina variabilis Richards, 1961	P(c)	16		Blackman and Eastop 1994 [Canada]
Calaphis arctica Hille Ris Lambers, 1952	P(c)	18		Blackman and Eastop 1994 [?]
C. betulaecolens (Fitch, 1851)	P(c)	20		Sun and Robinson 1966 , Robinson and Chen 1969a [Canada]
C. betulella Walsh, 1863	P(c)	18		Blackman 1980 [USA]
C. betulicola (Kaltenbach, 1843)	P(c)	18		Gut 1976 [Holland]
C. coloradensis Granovsky, 1939	P(c)	18		Blackman 1980 [USA]
C. flava Mordvilko, 1928	P(c)	18		Gut 1976 [Holland], Blackman 1980 (as *C. viridipallida* Palmer, 1952) [Canada]
C. leonardi Quednau, 1971	P(c)	20		Blackman and Eastop 1994 [?]
C. magnoliae (Essig & Kuwana, 1918)	?	8/7	XX/X0	Shinji 1927, 1931, 1941a (as *Chromaphis*), Blackman 1986 (as *Neocalaphis*) [Japan] (based on n(♂) = 4 (Shinji 1931))
		14/13		Shinji 1941a [Japan] (Blackman 1986 supposed that "Shinji must have had immature males of another species")
		20		Blackman 1986 [Japan]
C. magnolicolens (Takahashi, 1921)	?	20/19	XX/X0	Shinji 1927, 1931, 1941a [Japan], Blackman 1986 (as *Neocalaphis*) [Japan] (their own data and based on n(♂) = 10 (Shinji 1927, 1931))
		20		Blackman 1986 [Japan]
C. viridipallida Palmer, 1952	P(c)	18		Blackman 1980 [Canada]
Calaphis sp.	?	18/17	XX/X0	Shinji 1927, 1931, 1941a (as *C. betulaecolens* Fitch, 1851) [USA]
Callipterinella calliptera (Hartig, 1841)	P(c)	20		Blackman 1980 [USA], Blackman 1986 [Japan]
C. tuberculata (von Heyden, 1837)	P(c)	20		Blackman 1980 [Great Britain]
Chromaphis juglandicola (Kaltenbach, 1843)	P(c)	8		Dutta and Gautam 1993 [Shimla, Himachal Pradesh, India]
Chromocallis nirecola (Shinji, 1933)	P(c)	18		Blackman and Eastop 1994 [?]
Clethrobius comes (Walker, 1848)	P(c)	11 (structural heterozygote)		Blackman 1986 [Japan], Blackman 1988 [Japan; Great Britain; Ireland; Finland]
Ctenocallis israelica Hille Ris Lambers, 1954	?	16		Blackman and Eastop 2006 [?]
C. setosa (Kaltenbach, 1846)	P(c)	18		Blackman and Eastop 2006 [?]
Drepanaphis acerifoliae (Thomas, 1878)	P(c)	38		Shinji 1923 (as *Drefavaphis*) [USA]
		38/37	XX/X0	Shinji 1931 [USA]
D. simpsoni Smith, 1959	?	30		Blackman and Eastop 1994 [?]
D. utahensis Smith & Knowlton, 1943	?	30		Blackman 1980 [USA]
Drepanosiphum braggii Gillette, 1907	P(c)	30		Blackman 1980 [USA]
D. iranicum Hille Ris Lambers, 1971	P(c)	30		Blackman and Eastop 1994 [?]

Taxon	Life cycle	2n ♀/♂	Genetic system, ♀/♂	References and collecting data
D. platanoidis (Schrank, 1801)	P(c)	30		Shinji 1923 (as *Drefavosiphum flatavoides*) [USA]
		30/29	XX/X0	Shinji 1927, 1931, 1941a [USA]
Eucalipterus tiliae (Linnaeus, 1758)	P(c)	10		Blackman 1980 [Great Britain]
		10 (female), 8 (male)	$2(X_1X_2)/X_1X_20$	Blackman and Eastop 1994 [?]
		38-40?		Kuznetsova and Shaposhnikov 1973 [St. Petersburg, Russia]
Euceraphis betulae (Koch, 1855)	P(c)	10/8	$2(X_1X_2)/X_1X_20$	Blackman 1976, 1977 [Great Britain], Blackman 1980 [Europe; West of North America], Blackman and Spence 1996 [Great Britain], Blackman and De Boise 2002 [Great Britain; New Zealand; USA]
		9, 10/7, 8		Blackman 1988 [Europe]
E. betulae group 1 (from *Betula papyrifera*)	?	7 (♀), 6 (♂)		Blackman 1980 [Northwest Territories, Canada], Blackman 1988 (Fig. 4b) [Northwest Territories, Yukon, Canada]
E. betulae group 2	?	8		Sun and Robinson 1966 (as *E. deducta* Baker, 1917) , Robinson and Chen 1969a [Canada] (see comments in Blackman 1980)
E. betulae group 3	?	8 (+2) 2B-chromosomes		Blackman 1986 [Japan] (as *E. betulae*)
E. betulijaponicae (Matsumura, 1919)	P(c)	8 no B-chromosomes		Blackman 1986 [Japan] (as *E. betulae*)
		8(+1) 1B-chromosome 2n (♂) = 6 (+1) n (♂) = 4 (+1)		Blackman 1986 [Japan] (as *E. betulae*)
		9/7		Blackman and De Boise 2002 [Japan]
E. borealis Blackman, 2002	P(c)	8/7	XX/X0	Blackman 1980 (as *E. betulae* group) [Northwest Territories, Manitoba, Canada], Blackman and De Boise 2002 [Canada] (one pair of X-chromosome)
E. caerulescens Pashtshenko, 1984	P(c)	22		Blackman 1986 (as *E. ontakensis* Sorin, 1970), Blackman and De Boise 2002 [Japan]
E. gillettei Davidson, 1915	P(c)	15, 16, 18		Blackman 1980 [Canada; USA]
		15, 16, 18, 19/13, 17		Blackman 1988, Blackman and De Boise 2002 [Canada; USA]
E. lineata Baker, 1917	P(c)	16		Blackman 1980 (also as *E. deducta* Baker, 1917) [USA]
		16/14		Blackman 1988, Blackman and De Boise 2002 [USA]
E. mucida (Fitch, 1856)	P(c)	20		Blackman 1980 [New York, Pennsylvania, USA]
		20, 21, 22/18, 19, 20		Blackman 1988, Blackman and De Boise 2002 [USA] (the differences are due to variation in the number of accessory ("B") chromosomes)
E. ontakensis Sorin, 1970	?	22		Blackman 1986, 1988 [Japan]

Taxon	Life cycle	2n ♀/♂	Genetic system, ♀/♂	References and collecting data
E. papyrifericola Blackman, 2002	P(c)	9/7		Blackman and De Boise 2002 [Canada]
		9-10/8		Blackman 1980 [USA; Canada] (as *E. betulae* group) (the 2n=8 male record was probably due to misinterpretation of B-chromosomes in somatic cells, as all later males examined had 2n=7 (i.e. 2 X-chromosomes) – Blackman, personal comm.)
E. punctipennis (Zetterstedt, 1828)	P(c)	7, 8, 9		Blackman 1980 [Great Britain]
		7, 8 (without or with B chromo-somes)		Blackman 1976 [Great Britain]
		7, 8/5, 6		Blackman 1988 [Europe]
		8/6		Blackman and De Boise 2002 [?]
		8		Blackman 1977 [?], Sun and Robinson 1966 [Canada]
E. quednaui Blackman, 2002	P(c)	11/9		Blackman 1980 [Utah, USA] (as *E. betulae* group), Blackman and De Boise 2002 [western USA] (including 3 "B" chromosomes)
Hoplocallis picta (Ferrari, 1872)	P(c)	14		Blackman and Eastop 2015 [?]
Israelaphis carmini carmini Essig, 1953	P(c)	18		Blackman 1980 (as *I. tavaresi* Ilharco, 1961) [Portugal]
I. c. alistana Mier Durante, 1978	P(c)	18		Blackman 1980 (as *I. tavaresi alistana* Mier Durante, 1978) [Spain]
I. lambersi Ilharco, 1961	P(c)	16		Blackman and Eastop 2006 [?]
Melanocallis caryaefoliae (Davis, 1910)	P(c)	14		Blackman 1980 (as *M. fumipennellus* (Fitch)) [USA]
Mesocallis sawashibae (Matsumura, 1917)	P(c)	10		Blackman 1986 (as *Pterocallis*) [Japan]
M. (*Paratinocallis*) *corylicola* (Higuchi, 1972)	?	10		Blackman 1986 (as *Pterocallis*) [Japan]
Monaphis antennata (Kaltenbach, 1843)	P(c)	20		Blackman and Eastop 2015 [?]
Monellia caryella (Fitch, 1855)	P(c)	18		Blackman 1980 [USA]
M. microsetosa Richards, 1960	P(c)	18		Blackman 1980 [USA]
Monelliopsis caryae (Monell, 1879)	P(c)	18		Blackman 1980 [USA]
M. nigropunctata (Granovsky, 1931)	P(c)	10		Blackman 1980 [Canada; USA]
Myzocallis boerneri Stroyan, 1957	P(c)	14		Blackman and Eastop 1994 [?]
M. carpini (Koch, 1855)	P(c)	14		Blackman and Eastop 1994 [?]
M. coryli (Goetze, 1778)	P(c)	14		Gut 1976 [Holland]
M. glandulosa Hille Ris Lambers, 1948	P(c)	14		Blackman and Eastop 1994 [?]
M. (*Agrioaphis*) *castanicola* Baker, 1917	P(c)	12/11		Shinji 1941a (as *Agrioaphis castanae*) [Japan]
		14	XX/X0	Kuznetsova et al. 1988 [St. Petersburg, Russia]
		14/13	XX/X0	Shinji 1923, 1927, 1931 (as *M. castaneae* (Fitch, 1857)) [USA]
M. (*A.*) *myricae* (Kaltenbach, 1843)	P(c)	14		Gut 1976 [Holland]
M. (*Neodryomyzus*) *polychaeta* (David, 1969)	P(c)	12		Khuda-Bukhsh and Pal 1983b [Gharwal, Uttarakhand, India]
M. (*Neomyzocallis*) *discolor* (Monell, 1879)	P(c)	14		Robinson and Chen 1969a [Canada]
M. (*N.*) *punctata* (Monell, 1879)	P(c), P(o)	14		Sun and Robinson 1966, Robinson and Chen 1969a [Canada]

Taxon	Life cycle	2n ♀/♂	Genetic system, ♀/♂	References and collecting data
M. (*Pasekia*) *cocciferina* Quednau & Barbagallo, 1991	?P(o)	14		Blackman and Eastop 1994 [?]
M. (*P.*) *komareki* (Pašek, 1953)	P(c)	14		Blackman and Eastop 1994 [?]
Neochromaphis coryli Takahashi, 1961	P(c)	18		Chen and Zhang 1985b (cited after Blackman and Eastop 2015)
Neophyllaphis araucariae Takahashi, 1937	P(o), ?P(c)	18		Hales and Lardner 1988 [Australia]
N. brimblecombei Carver, 1971	P(c)	26/25		Hales and Lardner 1988 [Australia]
N. gingerensis Carver, 1959	P(c)	14		Hales and Lardner 1988 [Australia]
N. grobleri Eastop, 1955	P(c)	18		Hales and Lardner 1988 [Africa], Blackman and Eastop 1994 [?]
N. lanata Hales & Lardner, 1988	P(c)	24/23		Hales and Lardner 1988 [Australia]
N. podocarpi Takahashi, 1920	P(c), ?P(o)	24		Chen and Zhang 1985b (cited after Blackman and Eastop 2015)
		26		Blackman 1986 [Japan]
N. totarae Cottier, 1953	P(c)	10		Hales and Lardner 1988 [New Zealand], Blackman and Eastop 1994 [?]
Neuquenaphis bulbicauda Hille Ris Lambers, 1968	?	14	XX/X0	Blackman et al. 2003 [Chile]
N. edwardsi (Laing, 1927)	P(c)	12	XX/X0	Blackman et al. 2003 [Chile]
N. palliceps Hille Ris Lambers, 1968	?P(c)	6	XX/X0	Blackman et al. 2003 [Chile]
N. schlingeri Hille Ris Lambers, 1968	P(c)	12	XX/X0	Blackman et al. 2003 [Chile]
N. sensoriata Hille Ris Lambers, 1968	P(c)	16	XX/X0	Blackman et al. 2003 [Chile]
N. similis Hille Ris Lambers, 1968	?P(c)	14	XX/X0	Blackman et al. 2003 [Chile]
N. staryi Quednau & Remaudière, 1994	?	14	XX/X0	Blackman et al. 2003 [Chile]
N. valdiviana Carrillo, 1980	?	6	XX/X0	Blackman et al. 2003 [Chile]
N. (*Spicaphis*) *chilensis* Essig, 1953	?	10	XX/X0	Blackman et al. 2003 [Chile]
N. (*S.*) *essigi* Hille Ris Lambers, 1968	?	12	XX/X0	Blackman et al. 2003 [Chile]
Neuquenaphis sp. 1	?	12	XX/X0	Blackman et al. 2003 [Chile]
Neuquenaphis sp. 2	?	16	XX/X0	Blackman et al. 2003 [Chile]
Oestlundiella flava (Davidson, 1912)	P(c)	8		Blackman 1980 [USA; Canada]
Panaphis juglandis (Goetze, 1778)	P(c)	22		Blackman and Eastop 1994 [?]
Phyllaphis fagi (Linnaeus, 1761)	P(c)	16		Blackman 1986 [Great Britain]
P. fagifoliae Takahashi, 1919	P(c)	26/25	XX/X0	Shinji 1931 (as *P. fagi* (Linnaeus, 1767) see Blackman 1986), Blackman 1986 [Japan] (based on n(♂) = 13 (Shinji 1931))
Protopterocallis gigantea Bissell, 1978	P(c)	10		Blackman 1980 [USA]
Pterocallis alni (De Geer, 1773)	P(c)	20		Blackman 1980 [USA]
P. montana (Higuchi, 1972)	?	16		Blackman 1986 [Japan]
P. (*Recticallis*) *nigrostriata* (Shinji, 1941)	P(c)	c. 26		Blackman and Eastop 1994 [?]
Saltusaphis scirpus Theobald, 1915	P(c)	10		Blackman and Eastop 2015 [?]
Sarucallis kahawaluokalani (Kirkaldy, 1907)	P(c)	6		Kurl 1978 (as *Neotherioaphis chhenafuli* Behura and Dash) [Meerut, Uttar Pradesh, India], Blackman 1980 [USA]
		8		Dutta and Khuda-Bukhsh 1980 (as *Tinocallis*) [Kalyani, West Bengal, India]
Sinochaitophorus maoi Takahashi, 1936	P(c)	10		Chen and Zhang 1985a [Beijing area, China] (cited after Blackman and Eastop 2015)
Sensoriaphis nothofagi Cottier, 1953	P(c)	10		Blackman 1980 [New Zealand]

Taxon	Life cycle	2n ♀/♂	Genetic system, ♀/♂	References and collecting data
Shivaphis celti Das, 1918	P(c), P(o)	6/5	XX/X0	Shinji 1927, 1931, 1941a, Blackman 1986 [Japan] (based on n(♂) = 3 (Shinji 1931))
		10		Chen and Zhang 1985a [Beijing area, China] (cited after Blackman and Eastop 2015), Blackman 1986 [Hong Kong]
Sh. (*Sinishivaphis*) *hangzhouensis* (G. Zhang & Zhong, 1982)	?	10		Blackman and Eastop 1994 [?]
Stegophylla essigi Hille Ris Lambers, 1966	P(c), P(o)	12		Blackman 1980 [USA]
S. quercina Quednau, 1966	P(c)	> 30		Blackman and Eastop 1994 (as *Stegophylla quercicola* (Monell, 1879) [?]
Strenaphis elongata (Baker, 1917)	P(c)	10		Blackman and Eastop 2015 [?]
Subsaltusaphis aquatilis (Ossiannilsson, 1959)	?	8		Blackman and Eastop 2006 [?]
S. flava (Hille Ris Lambers, 1939)	P(c)	8		Blackman 1980 [Sweden]
S lambersi kamijiensis Sorin, 2005	P(c)	6		Blackman and Eastop 2015 [?] ("Blackman 1980, erroneously listed as *S. saracola*")
S. ornata (Theobald, 1927)	?	8		Gut 1976 [Holland]
S. picta (Hille Ris Lambers, 1939)	P(c)	10		Blackman 1980 [Sweden]
S. virginica (Baker, 1917)	P(c)	6		Blackman 1986 (as *S. saracola* Higuchi, 1972) [Japan]
Symydobius alniarius (Matsumura, 1917)	P(c)	20		Blackman 1986 [Japan]
S. intermedius Gillette and Palmer, 1930	P(c)	16		Blackman 1980 [USA]
S.oblongus (von Heyden, 1837)	P(c)	14 (male), 15 (female)		Blackman 1988 [Great Britain; Sweden; Czechoslovakia]
		16		Gut 1976 [Holland]
S. (*Yezocallis*) *kabae* (Matsumura, 1917)	P(c)	?26/25	XX/X0	Shinji 1931, 1941a, Blackman 1986 [Japan] (based on n(♂) = 13 (Shinji 1931))
Takecallis arundicolens (Clarke, 1903)	?P(c), ?P(o)	18		Blackman and Eastop 1984 [?], Blackman 1986 [Japan]
T. arundinariae (Essig, 1917)	P(o), ?P(c)	18		Blackman 1980 [USA; Great Britain], Chen and Zhang 1985a [Beijing area, China] (cited after Blackman and Eastop 2015), Blackman 1986 [Great Britain], Khuda-Bukhsh and Kar 1990 [Shillong, Meghalaya, India]
T. taiwana (Takahashi, 1926)	?P(c), ?P(o)	16		Blackman and Eastop 1984 [?]
Tamalia coweni (Cockerell, 1905)	P(c)	6/5	XX/X0	Morgan 1915 (as *Phyllaphis*), Ris 1942 [USA]
Therioaphis natricis Hille Ris Lambers & van den Bosch, 1964	?	16		Blackman and Eastop 2006 [?]
T. ononidis (Kaltenbach, 1846)	P(c)	16		Blackman and Eastop 2006 [?]
T. tenera (Aizenberg, 1956)	P(c)	6		Blackman and Eastop 2006 [?]
T. (*Pterocallidium*) *trifolii trifolii* (Monell, 1882)	P(c), P(o)	16		Blackman 1980 [USA]
T. (*P.*) *t. maculata* (Buckton, 1899)	P(c), P(o)	16		Blackman 1980 [USA; Australia]
T. (*Rhizoberlesia*) *riehmi* (Börner, 1949)	P(c)	16		Robinson and Chen 1969a [Canada]

Taxon	Life cycle	2n ♀/♂	Genetic system, ♀/♂	References and collecting data
Thripsaphis ballii pennsylvanica Quednau, 2010	?	8		Blackman and Eastop 2006 [?]
Tiliaphis coreana Quednau, 1979	P(c)	38		Chen and Zhang 1985b (cited after Blackman and Eastop 2015)
T. shinae (Shinji, 1924)	P(c)	14/13	XX/X0	Shinji 1927, 1931, 1941a (as *Therioaphis*), Blackman 1986 [Japan] (based on n(♂) = 7 (Shinji 1931))
Tinocallis ulmifolii (Monell, 1979)	P(c)	8		MacDonald and Harper 1965 (as *Myzocallis*), Robinson and Chen 1969a [Canada]
T. ulmiparvifoliae Matsumura, 1919	P(c)	16		Blackman and Eastop 1994 [?]
T. zelkowae (Takahashi, 1919)	P(c)	12		Blackman 1986 (as *T. nirecola* (Shinji 1924) [Japan], Blackman and Eastop 1994 [?]
T. (*Sappocallis*) *saltans* (Nevsky, 1929)	P(c)	16		Chen and Zhang 1985b (cited after Blackman and Eastop 2015)
T. (*S.*) *takachihoensis* Higuchi, 1972	P(c)	16		Blackman and Eastop 2015 [?]
T. (*S.*) *ulmicola* (Matsumura, 1919)	?	16		Blackman 1986 (as *Sappocallis*) [Japan]
Tinocalloides montanus Basu, 1970 (1969)	P(c)	18		Kurl 1981 [Shillong, Meghayala, India]
Tuberculatus (*Acanthocallis*) *quercicola* (Matsumura, 1917)	?	14/13	XX/X0	Shinji 1927, 1931, 1941a , Blackman 1986 [Japan] (based on n(♂) = 7 (Shinji 1931))
		16		Blackman 1986 [Japan], Chen and Zhang 1985b (cited after Blackman and Eastop 2015)
T. (*Acanthotuberculatus*) *radisectuae* G. Zhang, W. Zhang & Zhong, 1990	?	14		Chen and Zhang 1985b (cited after Blackman and Eastop 2015)
T. (*Nippocallis*) *kuricola* (Matsumura, 1917)	P(c)	14/13	XX/X0	Shinji 1927, 1931 (as *Callipterus*) [Japan], Blackman 1986 (as *Myzocallis*) [Japan] (own data and based on n(♂) = 7 (Shinji 1931))
T. (*Orientuberculoides*) *capitatus* (Essig et Kuwana, 1918)	P(c)	14		Blackman and Eastop 2015 [?]
T. (*O.*) *kashiwae* (Matsumura, 1917)	P(c)	14/13	XX/X0	Shinji 1927, 1931 [Japan], Blackman 1986 [Japan] (own data and based on n(♂) = 7 (Shinji 1927, 1931))
T. (*O.*) *paranaracola hemitrichus* Hille Ris Lambers, (1972) 1974	?	14		Blackman and Eastop 2015 [?]
T. (*O.*) *yokoyamai* (Takahashi, 1923)	P(c)	14		Blackman 1986 [Japan]
T. (*Tuberculoides*) *annulatus* (Hartig, 1841)	P(c)	14		Blackman 1980 (as *Tuberculoides*) [Great Britain; USA]
T. (*T.*) *moerickei* Hille Ris Lambers, (1972) 1974	?	14		Blackman and Eastop 2015 [?]
Tuberculatus sp.	?	14		Kar et al. 1990 [India]
Yamatocallis takagii (Takahashi, 1963)	?	c. 48		Blackman 1986 [Japan]
Fam. Chaitophoridae				
Atheroides hirtellus Haliday, 1839	P(c)	8		Blackman 1980 [Great Britain]
A. serrulatus Haliday, 1839	P(c)	8		Blackman 1980 [Sweden]
Chaitophorus capreae (Mosley, 1841)	P(c)	30		Blackman 1980 [Great Britain]
Ch. dorocolus Matsmura, 1919	P(c)	14		Shinji 1941a, Blackman 1986 [Japan] (based on n(♂) = 7 (Shinji 1941a)) (but see Blackman 1986 p. 77)
Ch. euphraticus Hodjat, 1981	P(c), ?P(o)	22		Blackman and Eastop 2015 [?]
Ch. furcatus Quednau ex Pintera, 1987	P(c)	16		Blackman and Eastop 1994 [?]

Taxon	Life cycle	2n ♀/♂	Genetic system, ♀/♂	References and collecting data
Ch. himalayensis (Das, 1918)	?	18		Dutta and Gautam 1993 [Shimla, Himachal Pradesh, India]
Ch. indicus A.K. Ghosh, M.R. Ghosh & D.N. Raychaudhuri, 1970	P(c)	18		Pal and Khuda-Bukhsh 1983 (as *Ch. manaliensis* Chakrabarti, 1975) [Garhwal, Uttarakhand, India], Dutta and Gautam 1993 (as *Ch. manaliensis* Chakrabarti, 1975) [Shimla, Himachal Pradesh, India]
Ch. inouyei Hille Ris Lambers, 1976	?	26		Blackman and Eastop 2015 [?]
Ch. leucomelas Koch, 1854	P(c)	4		Rubín de Celis and Ortiz 1993 [Lima, Peru]
		36		Blackman and Eastop 2015 [Israel]
		40		Blackman 1980 [Great Britain], Blackman and Eastop 2015 [Great Britain; South Africa]
Ch. ?matsumurai Hille Ris Lambers, 1960	?	14		Shinji 1927 (as *Ch. salicicolus*), 1931 (as *Ch. saliniger*), Blackman 1986 [Japan] (based on n(♂) = 7 (Shinji 1927, 1931, 1941))
Ch. neglectus Hottes & Frison, 1931	P(c)	12		Robinson and Chen 1969a [Canada]
Ch. niger Mordvilko, 1929	P(c)	30		Blackman and Eastop 2015 [?]
Ch. nigrae Oestlund, 1886	P(c)	24		Blackman and Eastop 1994 [?]
Ch. nigritus Hille Ris Lambers, 1966	P(c)	18		Dutta and Gautam 1993 [Shimla, Himachal Pradesh, India]
Ch. populeti (Panzer, 1801)	P(c)	10		Pal and Khuda-Bukhsh 1982 [Srinagar, Jammu and Kashmir, India]
		12		Blackman and Eastop 1994 [Iran; China]
		14		Shinji 1941a (as *Ch. populi*), Blackman 1986 [Japan] (based on n(♂) = 7 (Shinji 1941a)) (but see Blackman 1986, p. 77)
Ch. populialbae (Boyer de Fonscolombe, 1841)	P(c)	28		Chen and Zhang 1985 (cited after Blackman and Eastop 2015)
		30		Blackman and Eastop 2015 [?]
Ch. populicola Thomas, 1878	P(c)	18, 28, 32		Blackman and Eastop 1994 [?]
Ch. populifolii (Essig, 1912)	P(c)	12		Robinson and Chen 1969a (also as *Ch. populifolii neglectus* Hottes and Frison, 1931) [Canada]
Ch. saliapterus Shinji, 1924	?	14/13	XX/X0	Shinji 1927, 1931, 1941a, Blackman 1986 [Japan] (based on n(♂) = 7 (Shinji 1931)) (Blackman and Eastop 2015: "Shinji's record of 2n=14 (n=7) should probably be applied to another species of *Chaitophorus*")
		30		Blackman and Eastop 2015 [?}
Ch. salicti (Schrank, 1801)	P(c)	28		Blackman 1980 [Sweden]
Ch. prope *salijaponicus niger* (Mordvilko, 1929)	?	30		Kuznetsova and Shaposhnikov 1973 (*Ch.* aff. *niger* Mordv.) [Georgia; Turkmenistan]
Ch. saliniger Shinji 1924	P(c)	8		Shinji 1931, Blackman 1986 [Japan]
		14		Blackman 1986 [Japan] (based on n(♂) = 7 (Shinji 1931))
Ch. stevensis Sanborn, 1904	?	14		Blackman and Eastop 2015 [?]
Ch. tremulae Koch, 1854	P(c)	18		Blackman and Eastop 1994 [?]
Ch. truncatus Hausmann, 1802	P(c)	30		Blackman and Eastop 2015 [?]
Ch. viminalis Monell, 1879	P(c)	9, 10, 11		Morgan 1909b [USA]
		18		Robinson and Chen 1969a [Canada]
Chaitophorus sp. 1 (from *Populus euphratica*)	?	22		Blackman 1980 [Iran]

Taxon	Life cycle	2n ♀/♂	Genetic system, ♀/♂	References and collecting data
Chaitophorus sp. 2	?	26		Blackman 1986 [Japan]
Periphyllus acericola (Walker, 1848)	P(c)	18		Gut 1976 [Holland], Blackman and Eastop 1994 [?]
P. aceris (Linnaeus, 1761)	P(c)	16		Gut 1976 [Holland], Blackman and Eastop 1994 [?]
P. californiensis (Shinji, 1917)	P(c)	18		Blackman 1986 [Great Britain]
		20	XX/X0	Shinji 1927, 1931, 1941a (as *P. aceris*) [Japan] (but see Blackman 1986), Blackman 1986 [Japan] (based on n(♂) = 10 (Shinji 1931))
P. coracinus (Koch, 1854)	P(c)	18		Gut 1976 [Holland]
P. hirticornis (Walker, 1848)	P(c)	18		Gut 1976 [Holland], Blackman and Eastop 1994 [?]
P. koelreuteriae (Takahashi, 1919)	?	10		Chen and Zhang 1985a [Beijing area, China] (cited after Blackman and Eastop 2015)
		18		Blackman and Eastop 1994 [?]
		20/19	XX/X0	Shinji 1931, Blackman 1986 [Japan] (based on n(♂) = 10 (Shinji 1931))
		22		Shinji 1927, 1941a [Japan]
P. kuwanaii (Takahashi, 1919)	?	18		Blackman and Eastop 1994 [?]
P. lyropictus (Kessler, 1886)	P(c)	18		Gut 1976 [Holland]
P. negundinis (Thomas, 1878)	P(c)	20		Sun and Robinson 1966, Robinson and Chen 1969a [Canada]
P. testudinaceus (Ferni, 1852)	P(c)	18		Gut 1976 [Holland]
Sipha flava (Forbes, 1885)	P(c), P(o)	10		Mayo and Starks 1972 [USA]
S. glyceriae (Kaltenbach, 1843)	P(c)	10		Blackman and Eastop 2006 [?]
		12		Gut 1976 [Holland]
S. (*Rungsia*) *elegans* del Guercio, 1905	P(c)	6		Sun and Robinson 1966 (as *S. agropyrella* Hille Ris Lambers, 1939) , Robinson and Chen 1969a (as *S. kurdjumovi* Mordvilko, 1921)[Canada]
S. (*R.*) *maydis* Passerini, 1860	P(c), ?P(o)	12		Blackman and Eastop 2015 [?]
Fam. Aphididae				
Abstrusomyzus phloxae (Sampson, 1939)	P(o)	18		Blackman and Eastop 2006 [?]
Acaudinum centaureae (Koch, 1854)	P(c)	10		Kuznetsova 1968 (as *A. dolichosiphon* Mordvilko,1928) [St.Petersburg, Russia]
Acyrthosiphon auriculae Martin, 1981	P(c)	8		Martin 1981 [Great Britain]
A. bidenticola Smith, 1960	?	8		Blackman and Eastop 2006 [?]
A. boreale Hille Ris Lambers, 1952	P(c)	10		Blackman and Eastop 2015 [?]
A. caraganae caraganae (Cholodkovsky, 1907(1908))	P(c)	10		Sun and Robinson 1966, Robinson and Chen 1969a [Canada]
A. c. occidentale Hille Ris Lambers, 1947	P(c)	10		Blackman and Eastop 2015 [?]
A. ghanii Eastor, 1971	P(c), P(o)	10		Kapoor and Gautam 1994 [Shimla, Himachal Pradesh, India] (Blackman and Eastop 2015: " …but aphid was possibly misidentified as host was *Medicago*"), Blackman and Eastop 2006 [?]
A. gossypii Mordvilko, 1914	P(c), P(o)	6		Blackman 1980 [Iran], Gautam and Dhatwalia 2003 [Shimla, Himachal Pradesh, India]

Taxon	Life cycle	2n ♀/♂	Genetic system, ♀/♂	References and collecting data
A. ignotum Mordvilko, 1914	?	14		Pal and Khuda-Bukhsh 1984 (as *Metopolophium*), Khuda-Bukhsh and Pal 1986b (as *Metopolophium*) [Jamunetri, Uttarakhand, India]
A. sp. prope *ignotum* Mordvilko, 1914	?	10		Kuznetsova and Shaposhnikov 1973 [St. Petersburg, Russia]
A. kondoi Shinji, 1938	P(c)	10		Blackman 1980 [USA], Blackman 1986 [Japan]
A. lactucae (Passerini, 1860)	P(c)	16		Blackman and Eastop 1984 [?]
A. loti (Theobald, 1913)	P(c)	10		Blackman 1980 [Great Britain]
A. macrosiphum (Wilson, 1912)	P(c)	10		Blackman and Eastop 2015 [?]
A. malvae malvae (Mosley, 1841)	P(c)	10		Blackman 1980 (as *A. pelargonii* Kaltenbach, 1843) [Great Britain], Kurl and Chauhan 1987b [Barog, Himachal Pradesh, India]
		12		Kar et al. 1990 (as *Metopolophium* (*Metopolophium*) *malvae* (Mosley)) [India]
A. m. poterii Prior & Stroyan, 1964	P(c)	10		Blackman and Eastop 2015 [?]
A. m. rogersii (Theobald, 1913)	P(c)	10		Blackman and Eastop 2015 [?]
A. pisivorum G. Zhang, 1980	?	14		Chen and Zhang 1985a [Beijing area, China] (cited after Blackman and Eastop 2015)
A. pisum (Harris, 1776)	P(c)	8/7	XX/X0	Pagliai 1965, Manicardi, Bizzaro et al. 1991, Bizzaro et al. 2000 [Italia]
		8		Suomalainen 1933 (as *Macrosiphum pisi* (Kaltenbach, 1843)) [Finland], Colling 1955 [Great Britain], Sun and Robinson 1966, Harper and MacDonald 1968, Robinson and Chen 1969a [Canada], Kuznetsova and Shaposhnikov 1973 (as *Dactinotus basalis* Walker, 1948) [St. Petersburg, Russia], Kuznetsova 1974 (as *Dactinotus basalis* Walk.) [?], Blackman 1986 [Japan], Khuda-Bukhsh and Kar 1990 [Kalimpong, West Bengal, India], Kar et al. 1990 [India], Blackman and Spence 1996 [Great Britain], Gautam and Dhatwalia 2003 [Shimla, Himachal Pradesh, India]
A. primulae (Theobald, 1913)	?	16		Blackman and Eastop 2015 [?]
A. rubi Narzikulov, 1957	P(c)	10		Pal and Khuda-Bukhsh 1982, Khuda-Bukhsh and Pal 1986b (as *Metopolophium sonchifoliae* Raychaudhuri, Ghosh & Das, 1980) [Srinagar, Jammu and Kashmir, India]
		12		Kurl and Chauhan 1986c, Kurl and Chauhan 1987a (as *Metapolophium*) [Barog, Himachal Pradesh, India], Dutta and Gautam 1993 [Shimla, Himachal Pradesh, India]
A. scariolae Nevsky, 1929	?	18		Blackman and Eastop 1984 [?]
Akkaia polygoni Takahashi, 1919	P(c)	12		Shinji 1927, 1931 [Japan] (Blackman 1986 supposed that "Shinji's immature males were of another species of *Akkaia*")
		24		Blackman 1986 [Japan]
Akkaia sp.	?	12/11	XX/X0	Shinji 1931 [Japan] (see comments of Blackman 1986)
Aleurosiphon smilacifoliae (Takahashi, 1921)	P(c)	8		Blackman 1986 [Japan]

Taxon	Life cycle	2n ♀/♂	Genetic system, ♀/♂	References and collecting data
Amphicercidus japonicus (Hori, 1927)	P(c)	8		Chen and Zhang 1985b (cited after Blackman and Eastop 2015)
A. lonicerae Maity & Chakrabarti, 1982	?	18		Khuda-Bukhsh and Pal 1983a [Garhwal, Uttarakhand, India] (Blackman and Eastop 2015: «this was probably an error»)
A. tuberculatus David, Narayanan & Rajasingh, 1970 (1971)	?	6		Chauhan and Kurl 1990 [Dachigam, Jammu and Kashmir, India]
		12		Pal and Khuda-Bukhsh 1984 [Jamunetri, Uttarakhand, India]
Amphicercidus sp.		8?		Khuda-Bukhsh 1980 [Garhwal, Uttarakhand, India] (Blackman and Eastop 2015: *Amphicercidus lonicerae* Maity and Chakrabarti)
Amphorophora agathonica Hottes, 1950	P(c)	14		Robinson and Chen 1969a [Canada]
A. ampullata ampullata Buckton, 1876	P(c)	12		Blackman 1980, 2010 [Great Britain], Blackman 1986 [Japan]
A. a. bengalensis Hille Ris Lambers & Basu, 1966	?	12		Kurl and Chauhan 1986a [Kandaghat, Himachal Pradesh, India], Kurl and Chauhan 1987a [Manali, Himachal Pradesh, India]
A. a. laingi (Mason, 1925)	?	12		Sun and Robinson 1966 (as *A. laingi* (Mason, 1925)), Robinson and Chen 1969a (as *A. laingi* (Mason, 1925)) [Canada]
A. amurensis (Mordvilko, 1919)	?	14		Blackman 1986 [Japan]
A. forbesi Richards, 1959	?	12		Blackman and Eastop 2015 [?]
A. gei (Börner, 1939)	P(c)	12		Blackman 1980 [Great Britain]
A. idaei (Börner, 1939)	P(c)	18		Blackman et al. 1977 [Europe], Blackman 1980 [Great Britain; Germany]
A. pacifica Hill, 1968	P(o)	18		Blackman 1980 [USA]
A. parviflori Hill, 1958	?	12		Blackman 1980 [USA; Canada]
A. rossi Hottes & Frison, 1931	P(c)	46		Blackman and Eastop 2006 [?]
A. rubi (Kaltenbach, 1843)	P(c), P(o)	20, 21		Blackman et al. 1977 [Europe], Blackman 1980 [Great Britain]
A. rubitoxica Knowlton, 1954	?	30		Blackman 1980 [USA; Canada]
A. sensoriata Mason, 1923	?	72		Blackman 1980 [USA; Canada]
A. stachyophila Hille Ris Lambers, 1966	?	12		Blackman 1980 [USA]
A. stolonis Robinson, 1974	P(c)	48		Blackman 1980 [Canada]
A. tigwatensa Hottes, 1933	?	40		Blackman and Eastop 2006 [?]
A. tuberculata Brown & Blackman, 1985	P(c)	4	XX/X0	Blackman 1985, Blackman and Hales 1986, Blackman and Spence 1996, Spence and Blackman 1998 [Great Britain]
Amphorophora sp.	?	10		Blackman and Eastop 2006, Blackman 2010 [populations on *Athyrium felix-femina* in Netherlands and Great Britain]
Anuraphis catonii Hille Ris Lambers, 1935	P(c)	22		Kuznetsova 1968 [Crimea, Ukraine]
		26		Kuznetsova 1975 [Crimea, Ukraine]
A. farfarae (Koch, 1854)	P(c)	12		Kuznetsova 1968, 1975 [St. Petersburg, Russia], Kuznetsova 1974 [?]
A. farfarae dianae Shaposhnikov, 1974	P(o)	12		Kuznetsova and Shaposhnikov 1973 [Georgia], Kuznetsova 1974 [?]
A. pyrilaseri Shaposhnikov, 1950	P(c), P(o)	12		Kuznetsova 1968, 1975 [Crimea, Ukraine]
A. subterranea (Walker, 1852)	P(c), P(o)	22		Kuznetsova 1968 [St. Petersburg, Russia]
		26		Kuznetsova 1975 [St. Petersburg, Russia]

Taxon	Life cycle	2n ♀/♂	Genetic system, ♀/♂	References and collecting data
Anuromyzus cotoneasteris (Shaposhnikov, 1959)	P(c)	12		Kuznetsova 1968 (as *Dysaphis* (*Anuromyzus*)) [Georgia]
Aphidura pannonica Szelegiewicz, 1967	?	12		Blackman 1980 [Greece]
Aphis acaenovinae Eastop, 1961	?	8		Blackman and Eastop 2006 [Australia] ("D.F. Hales, pers. comm.")
A. achyranthi Theobald, 1929	?	7		Kurl and Chauhan 1987a [Solan, Himachal Pradesh,, India]
		8		Kurl and Chauhan 1986b [Solan, Himachal Pradesh, India]
A. affinis Del Guercio, 1911	P(c)	8		Pal and Khuda-Bukhsh 1982, Khuda-Bukhsh and Pal 1985 [Srinagar, Jammu and Kashmir, India], Gautam and Sharma 1990 [Himachal Pradesh, India], Dutta and Gautam 1993, Gautam and Dhatwalia 2003 [Shimla, Himachal Pradesh, India]
A. amaranthi Holman, 1974	?	8		Blackman 1980 [USA]
A. armata Hausmann, 1802	P(c)	8		Gut 1976 [Holland]
A. asclepiadis Fitch, 1851	?	8		Stevens 1906, 1909 [USA], Robinson and Chen 1969a [Canada], Chen and Zhang 1985a [Beijing area, China] (cited after Blackman and Eastop 2015)
A. brunnea Ferrari, 1872	?	8		Blackman and Eastop 2015 [?]
A. carduella Walsh, 1863	P(c)	8		Sun and Robinson 1966 (as *Aphis helianthi* Monell, 1879), Robinson and Chen 1969a (as *Aphis helianthi* Monell, 1879 and *A. kurosawella* Davis, 1919) [Canada]
A. celastrii Matsumura, 1917	P(c)	8		Blackman 1986 (as *A. citricola celastrii* Matsumura, 1917) [Japan]
A. chloris Koch, 1854	P(c)	8		Blackman and Eastop 2015 [?]
A. clematidis Koch, 1854	P(c)	8		Khuda-Bukhsh and Pal 1985 [Garhwal, Uttarakhand, India]
A. clerodendri Matsumura, 1917	?	8		Blackman and Eastop 2015 [?]
A. near *clerodendri* Matsumura, 1917	?	8		Chen and Zhang 1985a [Beijing area, China] (cited after Blackman and Eastop 2015)
A. clinopodii Passerini, 1861	P(c)	8		Blackman and Eastop 2015 [?]
		7,8		Kurl 1986 [Meghalaya, India]
A. craccivora Koch, 1854	P(o), P(c)	8		Kurl 1978 [Jodhpur, Rajasthan; Modinagar, Uttar Pradesh, India], Kulkarni and Kacker 1979 [Kolkata, West Bengal, India], Blackman 1980 [USA; Iran], Chen and Zhang 1985a, c (also as *A. robiniae* Machiati) [Beijing area, China] (Chen and Zhang 1985a cited after Blackman and Eastop 2015), Kurl and Chauhan 1986b [Himachal Pradesh, India], Kuznetzova and Sapunov 1985, 1987 [Russia], Kar and Khuda-Bukhsh 1989 [Kalimpong, West Bengal, India], Kar et al. 1990 [India], Sen and Khuda-Bukhsh 1992 [West Bengal, India], Dutta and Gautam 1993 [Kangra, Himachal Pradesh, India], Kapoor and Gautam 1994 [Himachal Pradesh, India], Bakhtadze et al. 2010 [Georgia]
		9		Blackman 1980 [Iran] (from *Lupinus*)

Taxon	Life cycle	2n ♀/♂	Genetic system, ♀/♂	References and collecting data
A. crepidis (Börner, 1940)	P(c)	8		Blackman and Eastop 2015 [?]
A. cytisorum cytisorum Hartig, 1841	P(c)	8		Blackman 1980 [USA], Chen and Zhang 1985a (as *sophoricola* Zhang) [Beijing area, China] (cited after Blackman and Eastop 2015)
A. cytisorum sarothamni Franssen, 1928	P(c)	8		Blackman and Eastop 2015 [?]
A. epilobii Kaltenbach, 1843	P(c)	8		Gut 1976 [Holland]
A. eugeniae van der Goot, 1917	?	8		Blackman 1980 [Philippines; Australia]
A. fabae fabae Scopoli, 1763	P(c)	8		Colling 1955 [Great Britain], Orlando 1965 [Italy], Kurl and Chauhan 1986b, 1987a [Kangra, Himachal Pradesh, India], Kuznetsova and Gandrabur 1991 [St. Petersburg, Russia], Dutta and Gautam 1993 [Solan, Himachal Pradesh, India], Kapoor and Gautam 1994 [Himachal Pradesh, India], Blackman and Spence 1996 [Great Britain], Rivi et al. 2009 [Italy] Jangra et al. 2014 [Jammu and Kashmir, India]
		8, 9		Panigrahy and Patnaik 1991 (as *A. citricola*) [Chatrapur, Odisha, India]
		8 (structural heterozygosity)		Blackman 1980 [anholicyclic population in California, USA]
A. f. evonymi Fabricius, 1775	P(c)	8		Blackman and Eastop 2015 [?]
A. f. mordvilkoi Börner & Janich 1922	P(c)	8		Blackman 1980 [Great Britain], Chen and Zhang 1985a [Beijing area, China] (cited after Blackman and Eastop 2015) Blackman and Eastop 2015 [?]
A. farinosa J.F. Gmelin, 1790	P(c)	6/5		Baehr 1908, 1912 (as *A. saliceti*) [Germany], Morgan 1909b (as *A. salicola* Gillette & Baker, 1895) [USA], Shinji 1941a (as *Aphis saliceti*) [Japan]
		6		Stevens 1906 [USA], Baehr 1909 (as *A. saliceti*) [Germany], Kuznetsova and Shaposhnikov 1973 [?], Chen and Zhang 1985a [Beijing area, China] (cited after Blackman and Eastop 2015)
		6	XX/X0	Kuznetsova and Gandrabur 1991 [St. Petersburg, Russia]
A. forbesi Weed, 1889	P(c)	8		Blackman and Eastop 1984 [?]
A. frangulae Kaltenbach, 1845	P(c), ?P(o)	8		Blackman and Eastop 2015 [?]
A. fukii Shinji, 1922	?	8		Blackman 1986 [Japan]
A. genistae Scopoli, 1763	P(c)	8		Gut 1976 [Holland]

Taxon	Life cycle	2n ♀/♂	Genetic system, ♀/♂	References and collecting data
A. gossypii Glover, 1877	P(o), P(c)	8		Stevens 1906, 1909 [USA], Shinji 1927 [Japan], Robinson and Chen 1969a [Canada], Kurl 1978 [Jodhpur, Rajasthan; Modinagar and Meerut, Uttar Pradesh, India], Kulkarni and Kacker 1979 [Baruipur, West Bengal, India], Chattopadhyay and Raychaudhuri 1980 [Kolkata, West Bengal, India], Khuda-Bukhsh and Datta 1981a, b [India], Khuda-Bukhsh and Pal 1985 [Srinagar, Jammu and Kashmir, India], Chen and Zhang 1985a [Beijing area, China] (cited after Blackman and Eastop 2015), Blackman 1986 [Japan] (their own data and based on n(♂) = 4 (Shinji 1927)), Kurl and Chauhan 1986b [Himachal Pradesh, India], Khuda-Bukhsh and Kar 1989b, Kar et al. 1990 [India], Gautam and Sharma 1990 [Himachal Pradesh, India], Kar and Khuda-Bukhsh 1991a [Meghalaya, West Bengal, India], Dutta and Gautam 1993 [Shimla, Himachal Pradesh, India], Gautam and Dhatwalia 2003 [Solan, Himachal Pradesh, India], Samkaria et al. 2010 [Palampur, Himachal Pradesh, India], Reeta Devi and Gautam 2012 [Kullu region, Himachal Pradesh, India]
		10		Shinji 1941a [Japan]
A. healyi Cottier, 1953	P(c)	8		Blackman and Eastop 2006 [New Zealand]
A. hederae hederae Kaltenbach, 1843	P(c)	8		Bakhtadze et al. 2010 [Georgia]
A. hederae pseudohederae Theobald, 1927	?	8		Blackman 1980 (as *A. hederae* form *pseudohederae* Theobald) [USA]
A. horii Takahashi, 1923	?	8		Chen and Zhang 1985b (cited after Blackman and Eastop 2015)
A. hyperici Monell, 1879	P(c)	8		Blackman and Eastop 2015 [?]
A. ichigo Shinji, 1922	?	8		Blackman 1986 [Japan]
A. idaei van der Goot, 1912	P(c)	8		Blackman 1980 [Great Britain]
A. ilicis Kaltenbach, 1843	?P(c)	8		Blackman 1980 [Great Britain]
A. kurosawai Takahashi, 1921	?P(c)	8		Blackman 1986 [Japan], Kurl and Chauhan 1987a, 1987b [Solan, Himachal Pradesh, India]
A. near *kurosawai* Takahashi, 1921	?	8		Chen and Zhang 1985a [Beijing area, China] (cited after Blackman and Eastop 2015)
A. lambersi (Börner, 1940)	P(c)	8		Blackman and Eastop 2015 [?]
A. longisetosa Basu, 1969(1970)	?	6		Kurl and Chauhan 1987a, b (as *Aphis ruborum longisetosus* Basu) [Solan, Himachal Pradesh, India], Khuda-Bukhsh and Kar 1990 (as *Aphis ruborum longisetosus* Basu) [Shillong, Meghalaya, India]
		8		Khuda-Bukhsh 1982 (as *A. ruborum longisetosus*) [Mussoorie, Uttarakhand, India], Khuda-Bukhsh and Pal 1985 (as *A. ruborum longisetosus*) [Srinagar, Jammu and Kashmir, India]

Taxon	Life cycle	2n ♀/♂	Genetic system, ♀/♂	References and collecting data
A. longituba Hille Ris Lambers, 1966	?	8		Kar et al. 1990 (as *A. clematidis simlaensis* Kumar & Burkhardt) [India], Dutta and Gautam 1993 (as *A. clematidis simlaensis* Kumar & Burkhardt) [Shimla, Himachal Pradesh, India]
A. loti Kaltenbach, 1862	P(c)	8		Blackman 1980 [Great Britain]
A. maculatae Oestlund, 1887	P(c)	8		Robinson and Chen 1969a [Canada]
A. nasturtii Kaltenbach, 1843	P(c)	8		Dionne and Spicer 1957 (as *A. abbreviata* Patch), Sun and Robinson 1966, Robinson and Chen 1969a [Canada], Kurl and Chauhan 1986b [Himachal Pradesh, India], Kar and Khuda-Bukhsh 1989 [Kalimpong, West Bengal, India], Dutta and Gautam 1993 [Shimla, Himachal Pradesh, India], Kapoor and Gautam 1994 [Himachal Pradesh, India], Gautam and Dhatwalia 2003 [Shimla, Himachal Pradesh, India], Samkaria et al. 2010 [Yol, Himachal Pradesh, India]
A. neogillettei Palmer, 1938	P(c)	8		Sun and Robinson 1966, Robinson and Chen 1969a [Canada]
A. nerii Boyer de Fonscolombe, 1841	P(o), P(c)	8		Kurl 1978 [Jodhpur, Rajasthan; Modinagar, Uttar Pradesh, India], Kulkarni and Kacker 1980 [India], Blackman 1980 [Great Britain], Chattopadhyay and Raychaudhuri 1980 [Kolkata, West Bengal, India], Khuda-Bukhsh and Datta 1981b [India], Khuda-Bukhsh and Pal 1985 [Garhwal, Uttarakhand, India], Kapoor and Gautam 1994 [Nahan, Himachal Pradesh, India]
A. newtoni Theobald, 1927	P(c)	8		Blackman 1980 [Great Britain]
A. odinae (van der Goot, 1917)	P(o), P(c)	8		Kurl 1980a (as *Toxoptera*) [Assam, Meghalaya, India], Pal and Khuda-Bukhsh 1980 (as *Toxoptera*) [Uttarakhand, India], Khuda-Bukhsh and Pal 1984a (as *Toxoptera*) [Triyuginarayan, Uttarakhand, India], Chen and Zhang 1985a (as *Toxoptera*) [Beijing area, China] (cited after Blackman and Eastop 2015), Blackman 1986 (as *Toxoptera*) [Japan], Kar and Khuda-Bukhsh 1989 (as *Toxoptera*) [Kalimpong, West Bengal, India], Kar et al. 1990 (as *Toxoptera*) [India]
		10		Shinji 1941a [Japan]
A. oestlundi Gillette, 1927	P(c)	8		Blackman and Eastop 2015 [?]
A. paraverbasci Chakrabarti (1976) 1977	?	8		Kurl and Chauhan 1986b, 1987a [Solan, Himachal Pradesh, India]
A. parietariae Theobald, 1922	P(c)	8		Blackman and Eastop 2015 [?]
A. platylobii Carver & White, 1970	?	8		Blackman and Eastop 2006 [New South Wales, Australia]
A. polygonata (Nevsky, 1929)	P(c)	8		Blackman and Eastop 2006 [?]
A. pomi De Geer, 1773	P(c)	8		Robinson and Chen 1969a [Canada], Kuznetsova and Shaposhnikov 1973 [Leningrad Prov., Russia], Gautam and Kumari 2003 [Shimla, Himachal Pradesh, India]
		7,8,9		Criniti et al. 2005 [Italy]

Taxon	Life cycle	2n ♀/♂	Genetic system, ♀/♂	References and collecting data
A. punicae Passerini, 1863	P(c), P(o)	8		Blackman and Eastop 1984 [?], Panigrahy and Patnaik 1987 [Chatrapur, Odisha, India], Dutta and Gautam 1993 [Shimla, Himachal Pradesh, India], Gautam and Dhatwalia 2003 [Solan, Himachal Pradesh, India]
A. rhamnifila David, Narayanan & Rajasingh, 1971	?	8		Khuda-Bukhsh 1982 [Mussoorie, India]
A. rubicola Oestlund, 1887	P(c)	8		Sun and Robinson 1966, Robinson and Chen 1969a [Canada]
A. ruborum (Börner & Schilder, 1931)	P(c)	8		Blackman 1980 [Great Britain], Bakhtadze et al. 2010 [Georgia]
A. rumicis Linnaeus, 1758	P(c)	8		Colling 1955 [Great Britain]
A. salicariae Koch, 1855	P(c)	8		Sun and Robinson 1966 (as *A. corniella* Hille Ris Lambers, 1935), Robinson and Chen 1969a (as *A. corniella* Hille Ris Lambers, 1935) [Canada]
A. sambuci Linnaeus, 1758	P(c), P(o)	8		Gut 1976 [Holland], Blackman 1986 [Europe; Japan], Manicardi et al. 1998 [Italy]
A. sambuci group	?	10		Shinji 1941a (as *A. sambuci* Linnaeus) [Japan]
		12		Shinji 1927, 1931 (as *A. sambuci* Linnaeus), Blackman 1986 [Japan] (based on n(♂) = 6 (Shinji 1927, 1931))
A. sedi Kaltenbach, 1843	P(c)	8		Blackman and Eastop 2015 [?]
A. solanella Theobald, 1914	P(c), ?P(o)	7		Blackman 1980 [Iran] (from *Solanum*)
		8		Blackman 1980 [Great Britain], Khuda-Bukhsh and Pal 1985 (as *A. fabae solanella* Theobald, 1914) [Garhwal, Uttarakhand, India], Kar and Khuda-Bukhsh 1989 (as *A. fabae solanella* Theobald) [Kalimpong, West Bengal, India], Gautam and Sharma 1990 [Himachal Pradesh, India], Kar et al. 1990 (as *A. fabae solanella* Theobald) [India], Dutta and Gautam 1993 (as *A. fabae solanella* Theobald, 1914) [Shimla, Himachal Pradesh, India], Gautam and Dhatwalia 2003 (as *A. fabae solanella*) [Shimla, Himachal Pradesh, India]
A. spiraecola Patch, 1914	P(c), P(o)	8		Sun and Robinson 1966, Robinson and Chen 1969a [Canada], Kurl 1978 [Jodhpur, Rajasthan, India], Kulkarni and Kacker 1981a [Solan, Himachal Pradesh, India], Khuda-Bukhsh 1982 [Mussoorie, India], Khuda-Bukhsh and Pal 1985 [Garhwal, Uttarakhand, India], Kurl and Chauhan 1986a, b (as *A. citricola* van der Goot) [Himachal Pradesh, India], Panigrahy and Patnaik 1987 (as *A. citricola* van der Goot) [Chatrapur, Odisha, India], Kar and Khuda-Bukhsh 1989 (as *A. citricola* van der Goot) [Shillong, Meghalaya, India], Sen and Khuda-Bukhsh 1992 [West Bengal, India], Kapoor and Gautam 1994 [Nahan, Himachal Pradesh, India], Gautam and Dhatwalia 2003 (as *A. citricola* van der Goot) [Solan, Himachal Pradesh, India]
		10		Chen and Zhang 1985a (as *A. citricola* van der Goot) [Beijing area, China] (cited after Blackman and Eastop 2015)

Taxon	Life cycle	2n ♀/♂	Genetic system, ♀/♂	References and collecting data
A. spiraephaga F.P. Müller, 1961	P(c)	8		Blackman and Eastop 2015 [?]
A. spiraephila Patch, 1914	P(c)	8		Robinson and Chen 1969a [Canada]
A. subnitida (Börner, 1940)	?	8		Blackman and Eastop 2015 [?]
A. taraxacicola (Börner, 1940)	P(c)	8		Blackman 1980 [Great Britain]
A. thaspii Oestlund, 1887	?	8		Robinson and Chen 1969a [Canada]
A. triglochinis Theobald, 1926	P(c)	8		Blackman and Eastop 1984 [?], Turčinavičienė et al. 1997 [Lithuania]
A. ulicis Walker, 1870	P(c)	8		Blackman 1980 [Great Britain]
A. umbrella (Börner, 1950)	P(c), ?P(o)	6		Blackman and Eastop 2006 [Iran]
		7		Blackman 1980 [Iran]
		8		Blackman and Eastop 2006 [Israel; Cyprus; Italy; Great Britain]
A. verbasci Schrank, 1801	P(c)	8		Khuda-Bukhsh and Pal 1985 [Kalyaani, West Bengal , India]
A. viburni Scopoli, 1763	P(c)	8		Colling 1955 [Great Britain]
A. violae Shouteden, 1900	P(c)	8		Blackman and Eastop 2015 [?]
A. (*Bursaphis*) *epilobiaria* Theobald, 1927	P(c)	8		Blackman 1980 [Great Britain]
A. (*B.*) *fluvialis* Martin, 1982	?P(o)	9		Blackman and Eastop 2015 [?]
A. (*B.*) *grossulariae* Kaltenbach, 1843	P(c)	8		Turčinavičienė et al. 1997 [Lithuania]
Aphis (*B.*) *neomexicana* (Cockerell & Cockerell, 1901)	?	8		Robinson and Chen 1969a [Canada]
A. (*B.*) *oenotherae* Oestlund, 1887	?P(c), P(o)	8		Blackman and Eastop 2015 [?]
		10/9		Stevens 1905a, b, 1906, 1910 [USA]
A. (*B.*) *schneideri* (Börner, 1940)	P(c)	8		Turčinavičienė et al. 1997 [Lithuania]
A. (*B. varians* Patch, 1914	P(c)	8		Sun and Robinson 1966, Robinson and Chen 1969a [Canada]
A. (*Toxoptera*) *aurantii* Boyer de Fonscolombe	P(o), ?P(c)	8		Pagliai 1961 [Italy], Kurl 1980a [Assam, Meghalaya, India], Kar et al. 1990 [India], Kar and Khuda-Bukhsh 1991a [Jammu and Kashmir, Meghalaya, West Bengal, India], Gautam and Dhatwalia 2003 [Shimla, Himachal Pradesh, India], Samkaria et al. 2010 [Palampur, Himachal Pradesh, India]
		8, 9		Panigrahy and Patnaik 1991 [Chatrapur, Odisha, India]
A. (*T.*) *citricidus* (Kirkaldy)	P(o), P(c)	7, 8		Kurl 1980a [Assam, Meghalaya, India], Kurl 1986 [Meghalaya, India], Kar and Khuda-Bukhsh 1989 [Kalimpong, West Bengal, India], Kar et al. 1990 [India]
A. (*Toxopterina*) *vandergooti* (Börner, 1939)	P(c)	8		Kuznetsova and Shaposhnikov 1973 (as *Chomaphis*) [Leningrad Prov., Russia], Blackman 1980 (as *Toxopterina*) [Great Britain]
Aphis sp. 1	?	8		Robinson and Chen 1969a [Canada]
Aphis sp. 2	?	8		Robinson and Chen 1969a [Canada]
Aphis sp. 3	?	8		Kuznetsova and Shaposhnikov 1973 [Crimea, Ukraine]
Aphis sp. 4	?	10		Khuda-Bukhsh and Pal 1985 [Srinagar, Jammu and Kashmir, India]
Aphis sp. 5	?	8		Chen and Zhang 1985a [Beijing area, China] (cited after Blackman and Eastop 2015)
Aphis sp. 6	?	8		Chen and Zhang 1985a [Beijing area, China] (cited after Blackman and Eastop 2015)
Aphis sp. 7	?	10		Khuda-Bukhsh and Kar 1990 [Shillong, Meghalaya, India]

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Aphis sp. 8	?	8		Dutta and Gautam 1993 [Shimla, Himachal Pradesh, India]
Aphis sp. 9	?	8		Dutta and Gautam 1993 [Shimla, Himachal Pradesh, India]
Aphis sp. 10 (*A. gossypii* complex)	?	8		Dutta and Gautam 1993 [Solan, Himachal Pradesh, India], Kapoor and Gautam 1994 [Nahan, Himachal Pradesh, India]
Aphthargelia symphoricarpi (Thomas, 1878)	P(c)	14		Sun and Robinson 1966, Robinson and Chen 1969a [Canada]
Aspidaphis adjuvans (Walker, 1848)	P(c)	12		Sun and Robinson 1966, Robinson and Chen 1969a [Canada]
		14,16		Blackman and Eastop 2006 [Cyprus; Israel; Iran]
Aspidophorodon (*Eoessigia*) *longicauda* (Richards, 1963)	?	20		Blackman and Eastop 2015 [?]
Atarsos grindeliae Gillette, 1911	P(c)	12		Robinson and Chen 1969a [Canada]
Aulacophoroides hoffmanni (Takahashi, 1937)	P(c)	14		Blackman and Eastop 2006 [?China]
Aulacorthum cercidiphylli (Matsmura, 1918)	?P(c)	12		Blackman 1986 [Japan]
A. cirsicola (Takahashi, 1923)	P(c)	10		Blackman 1986 [Japan]
A. dorsatum Richards, 1967	P(c)	12		Blackman and Eastop 2006 [?Western North America]
A. flavum F.P. Müller, 1958	P(c)	12		Blackman and Eastop 2006 [?]
A. ibotum (Essig & Kuwana, 1918)	?	14/13	XX/X0	Shinji 1927 (as *Macrosiphum ligustrumae*), 1931 (as *Macrosiphum*), Blackman 1986 [Japan] (based on n(♂) = 7 (Shinji 1927))
A. linderae (Shinji, 1922)	?P(c)	12		Shinji 1941b (as *Myzus*), Blackman 1986 [Japan] (based on n(♂) = 6 (Shinji 1941b))
A. magnoliae (Essig & Kuwana, 1918)	P(c)	12/11	XX/X0	Shinji 1931, 1941a (as *Amphorophora*) [Japan]
A. muradachi (Shinji, 1928)	?P(c)	10		Blackman and Eastop 2015 [?]
A. myriopteroni (G. Zhang, 1980)	?	10		Chen and Zhang 1985b (cited after Blackman and Eastop 2015)
A. palustre Hille Ris Lambers, 1947	?P(c), ?P(o)	34		Blackman and Eastop 2006 [?]
A. phytolaccae Miyazaki, 1968	?	10		Blackman and Eastop 2006 [Japan]
A. sensoriatum (David, Narayanan & Rajasingh, 1971)	?	18		Dutta and Gautam 1993 [Shimla, Himachal Pradesh, India]
A. smilacis Takahashi, 1965	?	10		Blackman 1986 [Japan]
A. solani (Kaltenbach, 1843)	P(c), P(o)	9, 10, 11		Blackman 1980 [Great Britain; California, USA]
		10		Dionne and Spicer 1957 [Canada], Pagliai 1966 [Italy], Kuznetsova and Shaposhnikov 1973 [St. Petersburg, Russia; Crimea, Ukraine], Kulkarni and Kacker 1980 [India], Pal and Khuda-Bukhsh 1980 [Triyuginarayan, Uttarakhand, India], Blackman 1986 [Japan], Khuda-Bukhsh and Pal 1986b [Triyuginarayan, Uttarakhand, India], Kapoor and Gautam 1994 [Nahan, Himachal Pradesh, India], Samkaria et al. 2010 [Shimla, Himachal Pradesh, India]
A. speyeri Börner, 1939	P(c)	10		Blackman 1980 [Iran]
A. spinacaudatum (Kumar & Burchardt, 1971)	?P(c)	12		Khuda-Bukhsh and Basu 1987 (as *A. magnoliae*) (cited after Blackman and Eastop 2015)

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Aulacorthum sp. 1	?	12		Khuda-Bukhsh and Kar 1990 [Kalimpong, West Bengal, India]
Aulacorthum sp. 2	?	12		Samkaria et al. 2010 [Yol, Himachal Pradesh, India]
Brachycaudus helichrysi (Kaltenbach, 1843)	P(c), P(o)	10, 11, 12, 13		Kurl 1986 [Meghalaya, India]
		12		Kuznetsova 1968 [Georgia], Kurl 1978 [Delhi, India], Pal and Khuda-Bukhsh 1980 [Gourikund, Uttarakhand, India], Kulkarni and Kacker 1981a [Dadhau, Himachal Pradesh, India], Raychaudhuri and Das 1987 [India], Gautam and Sharma 1990 [Himachal Pradesh, India], Dutta and Gautam 1993 [Shimla, Himachal Pradesh, India]
B. spiraeae Börner, 1932	P(c)	12		Gut 1976 [Holland]
B. (*Acaudus*) *klugkisti* (Börner, 1942)	P(c)	10		Blackman and Eastop 2015 [?]
B. (*A.*) *lychnidis* (Linnaeus, 1758)	P(c)	12		Kuznetsova 1968 [St.Petersburg, Russia]
B. (*A.*) *populi* (del Guercio, 1911)	P(c)	12		Blackman and Eastop 2015 [?]
B. (*Appelia*) *prunicola* Kaltenbach, 1843)	P(c)	12		Colling 1955 [Great Britain]
B. (*A.*) *prunifex* (Theobald, 1926)	P(c)	12		Blackman and Eastop 2015 [Great Britain]
B. (*A.*) *schwartzi* (Börner, 1931)	P(c)	12		Gut 1976 [Holland], Gautam and Dhatwalia 2003 [Shimla, Himachal Pradesh, India]
B. (*A.*) *tragopogonis tragopogonis* (Kaltenbach, 1843)	P(c)	12		Blackman and Eastop 1984 [?]
	?	11		Blackman and Eastop 1984 [Israel]
B. (*A.*) *t. setosus* (Kaltenbach, 1843)	?	12		Blackman and Eastop 2015 [Iran]
B. (*Mordvilkomemor*) *amygdalinus* (Schouteden, 1905)	P(c), P(o)	12		Kuznetsova 1968 [Georgia], Gautam and Kapoor 2002 [Una, Himachal Pradesh, India]
B. (*M.*) *rumexicolens* (Patch, 1917)	P(c)	12		Kurl and Chauhan 1987a [Barog, Himachal Pradesh, India]
B. (*M.*) *sedi* (Jacob, 1964)	P(c)	8		Blackman and Eastop 2006 [?]
B.(*Nevskyaphis*) *bicolor* (Nevsky, 1929)	P(o), ?P(c)	12		Blackman and Eastop 2015 [?]
B. (*N.*) *malvae* Shaposhnikov, 1964	?	12		Blackman and Eastop 2015 [?]
B. (*Prunaphis*) *cardui* (Linnaeus, 1758)	P(c)	10		Kuznetsova 1968 [Georgia], Blackman and Eastop 1984 [?]
B. (*P.*) *jacobi* Stroyan, 1957	P(c)	12		Gut 1976 [Holland]
B. (*Scrophulaphis*) *persicae* (Passerini, 1860)	P(o), ?P(c)	10		Blackman and Eastop 1984 [?]
Brachycolus cerastii (Kaltenbach, 1846)	P(c)	14/13	XX/X0	Gut 1976 [Holland]
Brachycorinella asparagi (Mordvilko, 1929)	P(c)	10		Blackman and Eastop 1984 [?]
B. lonicerina (Shaposhnikov, 1952)	P(c)	10		Blackman and Eastop 2006 [?]
Brachyunguis calotropicus Menon & Pawar, 1958	?	8		Kurl 1978, Kurl and Misra 1980, 1981 [Jodhpur, Rajasthan, India]
B. harmalae Das, 1918	P(c), ?P(o)	8		Blackman and Eastop 2015 [?]
B. lycii (Nevsky, 1928)	?	8		Blackman and Eastop 2006 [?]
B. tamaricis (Lichtenstein, 1885)	P(c)	8		Blackman and Eastop 2015 [?]

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Brevicoryne brassicae (Linnaeus, 1758)	P(c), P(o)	8, 9		Panigrahy and Patnaik 1991 [Chatrapur, Odisha, India]
		12, 14		Reeta Devi and Gautam 2012 [Kullu region, Himachal Pradesh, India]
		14		Kulkarni 1984 [Darjeeling, West Bengal, India]
		16/15	XX/X0	Cognetti 1961a, b, Cognetti and Cognetti-Varriale 1961, Pagliai 1962 [Italy]
		16		MacDonald and Harper 1965, Sun and Robinson 1966, Robinson and Chen 1969a [Canada], Kar et al. 1990 [India], Dutta and Gautam 1993 [Shimla, Himachal Pradesh, India], Kapoor and Gautam 1994 [Himachal Pradesh, India], Gautam and Dhatwalia 2003 [Hamirpur, Himachal Pradesh, India], Giannini et al. 2003 [Italy]
Capitophorus carduinus (Walker, 1850)	P(c)	16		Blackman and Eastop 2015 [?]
C. cirsiiphagus Takahashi, 1961	?P(c)	16		Blackman and Eastop 2006 (recorded as *C. elaeagni* in Blackman, 1986) [?]
C. elaeagni (Del Guercio, 1894)	P(c)	16		Robinson and Chen 1969a [Canada], Blackman 1986 [Japan]
C. formosartemisiae (Takahashi, 1921)	?	16		Blackman 1986 [Japan]
C. hippophaes (Walker, 1852)	P(c), ?P(o)	10		Sun and Robinson 1966, Robinson and Chen 1969a [Canada]
C. h. javanicus Hille Ris Lambers, 1953	?	10		Chen and Zhang 1985a [Beijing area, China] (cited after Blackman and Eastop 2015), Blackman 1986 [Japan], Kar et al. 1990 [India]
C. horni Börner, 1931	P(c)	16		Blackman 1980 [Great Britain]
C. inulae (Passerini, 1860)	?P(o)	16		Blackman and Eastop 2015 [?]
C. mitegoni Eastop, 1956	?P(c)	9		Kurl and Chauhan 1986a, 1987a [Manali, Himachal Pradesh, India]
C. pakansus Hottes & Frison, 1931	P(c)	16		Blackman and Eastop 1994 [?]
Capitophorus sp. [*?eniwanus* Miyazaki, 1971]	?	10		Blackman and Eastop 2006 [China, near Beijing]
Casimira canberrae (Eastop, 1961)	P(c)	8		Blackman and Eastop 2015 [?]
Catamergus kickapoo (Hottes & Frison, 1931)	P(c)	10		Robinson and Chen 1969a (as *Macrosiphum*) [Canada]
Cavariella aegopodii (Scopoli, 1763)	P(c), P(o)	10		Blackman 1980 [Great Britain; Iran], Dutta and Gautam 1993, Gautam and Dhatwalia 2003 [Shimla, Himachal Pradesh, India]
		8, 9, 10		Dhatwalia and Gautam 2009 [Himachal Pradesh, India]
C. araliae Takahashi, 1921	?P(c), P(o)	14		Blackman 1986 [Japan]
C. archangelicae (Scopoli, 1763)	P(c)	6		Blackman 1980 [Great Britain]
C. borealis Hille Ris Lambers, 1952	P(c)	6		Blackman and Eastop 1994 [?]
C. cicutae (Koch, 1854)	P(c)	10		Blackman 1980 [Iran]
C. intermedia Hille Ris Lambers, 1969	?P(c)	6		Blackman 1980 [Great Britain]
C. japonica (Essig & Kuwana, 1918)	P(c)	8		Blackman 1986 [Japan]
C. konoi Takahashi, 1939	P(c)	8		Blackman and Eastop 1984 [?], Blackman 1986 [Iceland]
C. pastinacae (Linnaeus, 1758)	P(c)	8		Gut 1976 [Holland]
C. salicicola (Matsumura, 1917)	P(c)	10		Chen and Zhang 1985b (cited after Blackman and Eastop 2015)
C. sericola Shinji, 1927	?	8		Shinji 1927 [Japan]

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C. theobaldi (Gillette & Bragg, 1918)	P(c)	8, 10		Blackman 1980 [Great Britain]
C. (*Cavaraiellia*) *aquatica* (Gillette & Bragg, 1916)	P(c)	8		Blackman and Eastop 2015 [?]
C. (*Cavariellinepicauda*) *oenanthi* (Shinji, 1922)	?	8/7	XX/X0	Shinji 1931, Blackman 1986 [Japan] (based on n(♂) = 4(Shinji 1931))
Cavariella sp. 1	?	10		Robinson and Chen 1969a [Canada]
Cavariella sp. 2	?	6		Kuznetsova 1978 [St.Petersburg, Russia]
Cavariella sp. 3	?	10		Khuda-Bukhsh 1980 [Gharwal, Uttarakhand, India]
Cavariella sp. 4	?	12		Kar et al. 1990 [India]
Ceruraphis eriophori (Walker, 1848)	P(c)	14		Kuznetsova and Gandrabur 1991 [St. Petersburg, Russia] (they also noted that 2n=8 in Kuznetsova 1968, 1974 was erroneous)
Chaetomyzus sp.	?	12		Dutta and Gautam 1993 [Shimla, Himachal Pradesh, India]
Chaetosiphon gracilicorne David, Rajasingh & Narayanan, (1970) 1971	?P(c)	16		Dutta and Gautam 1993 [Shimla, Himachal Pradesh, India]
Ch. (*Pentatrichopus*) *coreanum* (Paik, 1965)	P(c)	8		Blackman and Eastop 1984 [?], Blackman 1986 [Japan]
Ch. (*P.*) *fragaefolii* (Cockerell, 1901)	P(o), ?P(c)	12, 13, 14, 15		Blackman et al. 1987 [Old World, North America]
		13, 14,15		Blackman and Eastop 2015 [?]
		14		Blackman and Eastop 1984 [?]
Ch. (*P.*) *jacobi* Hille Ris Lambers, 1953	P(o)	17		Blackman et al. 1987 [Western North America]
Ch. (*P.*) *minor* Forbes, 1884	P(c)	12		Blackman et al. 1987 [Eastern North America]
Ch. (*P.*) *tetrarhodum* (Walker, 1849)	P(c)	14		Blackman 1980 (as *Pentatrichopus*) [Great Britain]
		16		Blackman and Eastop 2006 [one sample from Australian Capital Territory, Australia]
Ch. (*P.*) *thomasi* Hille Ris Lambers, 1953	P(c)	12		Blackman et al. 1987 [Western North America]
Chomaphis mira Mordvilko, 1928	?	8		Kuznetsova and Shaposhnikov 1973 [Voronezh, Russia]
Coloradoa artemisiae (Del Guercio, 1913)	P(c)	16		Robinson and Chen 1969a [Canada]
C. bournieri Remaudière & Leclant, 1969	P(o)	22		Blackman and Eastop 2006 [?]
C. huculaki Szelegiewicz, 1981	?	c.24		Blackman and Eastop 2006 [immature specimen from China]
C. ponticae (Börner, 1940)	?	16		Blackman and Eastop 2015 [?]
C. rufomaculata (Wilson, 1908)	P(o), ?P(c)	8		Panigrahy and Patnaik 1987 (Chatrapur, Odisha, India)
		8, 17		Panigrahy and Patnaik 1991 [Chatrapur, Odisha, India]
		18		Das et al. 1985 [India]
C. santolinae Hille Ris Lambers, 1948	?	20		Blackman and Eastop 2006 [?] (specimens from *Artemisia monosperma*)
C. viridis (Nevsky, 1929)	?	16		Blackman and Eastop 2006 [?]
Corylobium avellanae (Schrank, 1801)	P(c)	10		Blackman and Eastop 1984 [?]
Cryptaphis bromi Robinson, 1967	P(c)	16		Robinson and Chen 1969a [Canada]
C. geranicola (Shinji, 1935)	P(c)	14		Blackman 1986 [Japan]
C. poae (Hardy, 1850)	P(c)	16		Sun and Robinson 1966 [Canada]
		20		Blackman and Eastop 1984 [?]

Taxon	Life cycle	2n ♀/♂	Genetic system, ♀/♂	References and collecting data
Cryptomyzus alboapicalis (Theobad, 1916)	P(c), P(o)	12		Blackman 1980 [Great Britain], Bašilova et al. 2008 [Lithuania]
C. ballotae Hille Ris Lambers, 1953	P(o), ?P(c)	12		Blackman 1980 [Great Britain]
C. galeopsidis (Kaltenbach, 1843)	P(c)	12		Blackman 1980 [Great Britain], Bašilova et al. 2008 [Lithuania]
C. korschelti Börner, 1938	P(c)	12		Bašilova et al. 2008 [Lithuania]
C. leonuri Bozhko, 1961	P(c)	12		Bašilova et al. 2008 [Lithuania]
C. maudamanti Guldemond, 1990	P(c)	12		Bašilova et al. 2008 [Lithuania]
C. ribis (Linnaeus, 1758)	P(c)	12		Sun and Robinson 1966 , Robinson and Chen 1969a [Canada], Bašilova et al. 2008 [Lithuania]
C. taoi Hille Ris Lambers, 1963	P(c)	12		Blackman and Eastop 2015 [?]
C. ulmeri Börner, 1952	P(c)	12		Bašilova et al. 2008 [Lithuania]
C. (*Ampullosiphon*) *stachydis* (Heikenheimo, 1955)	P(c)	12		Blackman and Eastop 2006 [?]
Cryptosiphum artemisiae Buckton, 1879	P(c)	8		Blackman 1980 [Great Britain], Blackman 1986 [Japan]
Delphiniobium canadense (Robinson, 1968)	P(c)	20		Blackman and Eastop 2006 [?]
D. yezoense Miyazaki, 1971	P(c)	12		Chen and Zhang 1985a [Beijing area, China] (cited after Blackman and Eastop 2015)
Diuraphis mexicana (Baker, 1934)	P(o), ?P(c)	8		Blackman and Eastop 2006 [?]
D. noxia (Mordvilko ex Kurdjumov, 1913)	P(c), ?P(o)	10		Blackman 1980 [South Africa]
		10/9	XX/X0	Novotná et al. 2011 [Czech Republic]
D. (*Holcaphis*) *agrostidis* (Muddathir, 1965)	P(c)	12		Blackman 1980 (as Holcaphis) [Great Britain]
D. (*H.*) *frequens* (Walker, 1848)	P(c)	14		Gut 1976 [Holland]
D. (*H.*) *holci* (Hardy, 1850)	P(c)	14		Gut 1976 [Holland]
Dysaphis affinis (Mordvilko, 1928)	P(c)	12		Kuznetsova 1968 [Georgia]
D. angelicae (Koch, 1854)	P(c)	12		Blackman and Eastop 2015 [?]
D. anthrisci anthrisci Börner, 1950	P(c)	12/11	XX/X0	Kuznetsova 1968 [St. Petersburg, Russia], Kuznetsova and Gandrabur 1991 [Ukraine]
		12		Gautam and Kapoor 2002 [Shimla, Himachal Pradesh, India]
D. a. majkopica Shaposhnikov, 1961	P(c)	12		Kuznetsova 1968 [North Caucasus, Russia], Kuznetsova 1974 [?]
D. apiifolia (Theobald, 1923)	P(o), P(c)	12		Blackman 1980 [Iran]
D. chaerophyllina Shaposhnikov, 1959	P(c)	12	XX/X0	Kuznetsova 1968 [North Caucasus, Russia], Kuznetsova 1974 [?]
D. crataegi crataegi (Kaltenbach, 1843)	P(c), P(o)	12		Blackman 1980 [Great Britain]
D. crataegi heracleana (Narzikulov, 1955)	?	12		Kuznetsova and Daniyarova1980 [Kondara, Tajikistan]
D. devecta (Walker, 1849)	P(c)	12/11	XX/X0	Kuznetsova and Gandrabur 1991 [St. Petersburg, Russia]
D. foeniculus foeniculus (Theobald, 1923)	P(o)	12		Blackman and Eastop 1984 [?], Gautam and Kapoor 2002 [Shimla, Himachal Pradesh, India]
D. f. malidauci Shaposhnikov, 1976	P(c)	12		Kuznetsova 1968 [Alma-Ata, Kazakhstan]
D. hirsutissima (Börner, 1940)	P(c)	12		Kuznetsova 1968 [St.Petersburg, Russia]
D. narzikulovi Shaposhnikov, 1956	P(c)	12		Kuznetsova and Daniyarova1980 [Kondara, Tajikistan]

Taxon	Life cycle	2n ♀/♂	Genetic system, ♀/♂	References and collecting data
D. newskyi aizenbergi (Shaposhnikov, 1949)	P(c)	12		Kuznetsova 1968 (as *D. aizenbergi* (Shaposhnikov, 1949)) [St.Petersburg, Russia]
D. radicola (Mordvilko, 1897)	P(c)	12		Kuznetsova 1968 [St.Petersburg, Russia], Blackman 1980 [Great Britain]
D. rumecicola (Hori, 1927)	P(c), P(o)	12		Kuznetsova and Daniyarova 1980 (as *D. emicis* Mim.) [Kondara, Tajikistan]
D. tulipae (Boyer de Fonscolombe, 1841)	P(o)	11, 12		Blackman 1980 [Great Britain]
D. (*Cotoneasteria*) *microsiphon* (Nevsky, 1929)	P(c)	12		Kuznetsova 1968 [Georgia]
D. (*Pomaphis*) *aucupariae* (Buckton, 1879)	P(c)	12		Blackman and Eastop 1994 [?], Blackman and Eastop 2006 [?]
D. (*P.*) *maritima* (Hille Ris Lambers, 1955)	P(c)	12		Blackman and Eastop 2006 [?]
D. (*P.*) *pavlovskyana* Narzikulov, 1957	P(c)	12		Khuda-Bukhsh and Pal 1983a [Garhwal, Uttarakhand, India] (apparently it is *Dysaphis indica* Chakrabarti & Medda, 1993)
D. (*P.*) *plantaginea* (Passerini, 1860)	P(c)	12		Kuznetsova 1968 (as *D. mali* (Ferrari, 1872) [Crimea, Ukraina], Blackman 1986 [Japan], Criniti et al. 2009 [Italy]
D. (*P.*) *pyri* (Boyer de Fonscolombe, 1841)	P(c)	12		Kuznetsova 1968 [Crimea, Ukraina]
D. (*P.*) *reamuri* Mordvilko, 1928	P(c)	12		Kuznetsova 1968 [Crimea, Ukraina]
D. (*P.*) *sorbi* (Kaltenbach, 1843)	P(c)	12		Kuznetsova 1968 [St.Petersburg, Russia]
Dysaphis sp.	?	12		Kuznetsova 1968 (as *D. crataegi* (Kaltenbach, 1843)) [Georgia]
Elatobium abietinum (Walker, 1849)	P(c), P(o)	18		Blackman 1980 [Great Britain]
Elatobium sp.	?	8		Khuda-Bukhsh and Kar 1990 [Shillong, Meghalaya, India]
Ericaphis fimbriata (Richards, 1959)	P(c)	14		Blackman and Eastop 2015 [?]
E. gentneri (Mason, 1947)	P(c)	18, 19, 20, 21, 23/17, 19		Blackman and Eastop 2015 [British Columbia, Canada]
E. scammelli (Mason, 1940)	P(c)	14		Blackman and Eastop 2015 [?]
E. wakibae (Hottes, 1934)	P(c)	12		Blackman and Eastop 2015 [?]
Ericolophium holsti (Takahashi, 1935)	?	22		Dutta and Gautam 1993 [Shimla, Himachal Pradesh, India]
E. itoe (Takahashi, 1925)	?	18		Blackman and Eastop 2006 [?]
Eucarazzia elegans (Ferrari, 1872)	?	12		Gautam and Kapoor 2002 [Shimla, Himachal Pradesh, India]
Eumyzus eastopi Maity & Chakrabarti ex Maity, Bhattacharya & Chakrabarti, 1982	?	10		Khuda-Bukhsh and Pal 1986b [Triyuginarayan, Uttarakhand, India]
E. gallicola Takahashi, 1963	?	12		Blackman 1986 [Japan]
E. impatiensae (Shinji, 1924)	P(c)	10		Pal and Khuda-Bukhsh 1980, Khuda-Bukhsh and Pal 1986b [Triyuginarayan, Uttarakhand, India]
		12		Blackman 1986 [Japan]
Gypsoaphis oestlundi Hottes, 1930	?	4		Sun and Robinson 1966 [Canada], Robinson and Chen 1969a [Canada]
Hayhurstia atriplicis (Linnaeus, 1761)	P(c)	14		Sun and Robinson 1966 (as *Brachycolus*), Robinson and Chen 1969a [Canada], Chen and Zhang 1985a [Beijing area, China] (cited after Blackman and Eastop 2015), Dutta and Gautam 1993 [Shimla, Himachal Pradesh, India]

Taxon	Life cycle	2n ♀/♂	Genetic system, ♀/♂	References and collecting data
Hyadaphis coriandri (B. Das, 1918)	P(c), ?P(o)	12		Blackman and Eastop 2006 [?]
		13		Blackman 1980 [Iran]
		14		Kuznetsova and Shaposhnikov 1973 (as *Semiaphis tataricae* (Aizenberg, 1935) [St. Petersburg, Russia]
H. foeniculi (Passerini, 1860)	P(c)	12, 14		Blackman and Eastop 2006 [?] (one sample from *Foeniculum* had a mixture of 2n=12 and 2n=14 individuals)
		13		Blackman and Eastop 2006 [?] (one sample from *Lonicera*, a *foeniculi* × *passerinii* hybrid?)
		14		Gut 1976 [Holland] (on *Conium maculatum*), Gautam and Kapoor 2002 [Una, Himachal Pradesh, India], Blackman and Eastop 2006 [?] (for samples of *H. foeniculi* from *Conium* and *Foeniculum*)
H. passerinii (del Guercio, 1911)	P(c), P(o)	12		Kuznetsova and Shaposhnikov 1973 [Crimea, Ukraine]
H. tataricae (Aizenberg, 1935)	P(c)	14		Blackman and Eastop 2015 [?]
Hyadaphis sp.	?	12		Blackman 1980 [Great Britain]
Hyalomyzus raoi Hille Ris Lambers, 1973	?	8		Khuda-Bukhsh and Kar 1990 [Shillong, Meghalaya, India]
Hyalopteroides humilis (Walker, 1852)	P(c)	16		Blackman 1980 [Great Britain]
Hyalopterus amygdali (Blanchard, 1840)	P(c)	10		Chen and Zhang 1985a [Beijing area, China] (cited after Blackman and Eastop 2015)
H. pruni (Geoffroy, 1762)	P(c)	10		Shibata 1941 [Japan], Robinson and Chen 1969a [Canada], Kuznetsova and Shaposhnikov 1973 [St.Petersburg, Russia; Turkmenistan], Kuznetsova 1974 [?], Pal and Khuda-Bukhsh 1982, Khuda-Bukhsh and Pal 1984a [Srinagar, Jammu and Kashmir, India], Blackman 1986 [Japan]
Hyperomyzus carduellinus (Theobald, 1915)	P(o)	12		Kurl and Chauhan 1986a [Dharampur, Himachal Pradesh, India], Kurl and Chauhan 1987a [Naldehra, Himachal Pradesh, India], Gautam and Kapoor 2002 [Una, Himachal Pradesh, India]
H. lactucae (Linnaeus, 1758)	P(c), P(o)	12		Colling 1955 [Great Britain], Sun and Robinson 1966 (as *Nasonovia*), Robinson and Chen 1969a [Canada], Dutta and Gautam 1993 [Shimla, Himachal Pradesh, India]
H. lampsanae (Börner, 1932)	P(c)	12		Blackman 1980 [Great Britain]
H. (*Hyperomyzella*) *rhinanthi* (Schouteden, 1903)	P(c)	12		Blackman and Eastop 2015 [?]
H. (*Neonasonovia*) *picridis* (Börner & Blunck, 1916)	P(c)	12		Blackman 1980 [Great Britain], Blackman and Eastop 1984 [?]
H. (*N.*) *ribiellus* (Davis, 1919)	P(c)	12		Sun and Robinson 1966 (as *Amphorophora*), Robinson and Chen 1969a (as *Kakimia ribiella* (Davis, 1919)) [Canada], Blackman and Eastop 1984 [?]
Hysteroneura setariae (Thomas, 1878)	P(c), P(o)	12		Robinson and Chen 1969a [Canada], Kurl 1986 [Meghalaya, India], Khuda-Bukhsh and Kar 1990 [Kalyani, West Bengal, India], Kapoor and Gautam 1994 [Shimla, Himachal Pradesh, India]
Idiopterus nephrelepidis Davis, 1909	P(o)	12		Blackman and Spence 1996 [Great Britain]
		13		Blackman 1980 [Great Britain]

Taxon	Life cycle	2n ♀/♂	Genetic system, ♀/♂	References and collecting data
Illinoia alni (Mason, 1925)	P(c)	10		Blackman 1980 [Canada]
I. azaleae (Mason, 1925)	P(o), ?P(c)	10		Blackman and Eastop 1984 [?]
I. liriodendri (Monell, 1879)	P(c)	10		Blackman 1980 [USA]
I. morrisoni (Swain, 1918)	P(o)	10		Blackman and Eastop 2015 [?]
I. pepperi (MacGillivray, 1958)	P(c)	22		Blackman and Eastop 2000 [?]
I. richardsi (MacGillivray, 1958)	?	10		Blackman 1980 [Canada]
I. spiraeae (MacGillivray, 1958)	?	10		Blackman and Eastop 2015 [?]
I. subviride (MacDougall, 1926)	?	10		Blackman and Eastop 2006 [?]
I. wahnaga (Hottes, 1952)	P(c)	10		Sun and Robinson 1966 (as *Masonaphis*), Robinson and Chen 1969a (as *Masonaphis*) [Canada]
I. (*Amphorinophora*) *crystleae* (Smith & Knowlton, 1939)	P(c)	16		Blackman and Eastop 2006 [?]
I. (*Masonaphis*) *lambersi* (MacGillevray, 1960)	P(c), P(o)	10		Gut 1976 (as *Masonaphis*) [Holland]
I. (*M.*) *menziesiae* (Robinson, 1969)	P(c)	10		Blackman and Eastop 2006 [?]
I. (*Oestlundia*) *davidsoni* Mason, 1925	?	12		Blackman 1980 [USA]
I. (*O.*) *maxima* (Mason, 1925)	P(c)	12		Blackman 1980 [Canada]
I. (*O.*) *rubicola* (Oestlund, 1886)	P(c)	12		Shinji 1931 (as *Amphorophora rubicola* (Oestlund) [?USA], Robinson and Chen 1969a (as *Masonaphis*) [Canada]
Impatientinum asiaticum asiaticum Nevsky, 1929	P(c)	16		Gut 1976 [Holland], Pal and Khuda-Bukhsh 1980 [Sonprayag, Uttarakhand, India], Khuda-Bukhsh and Pal 1986b [Gourikund, Uttarakhand, India], Kapoor and Gautam 1994 [Nahan, Himachal Pradesh, India]
I. a. dalhousiensis Verma, 1969	?P(c)	16		Kurl and Chauhan 1986a, 1987a [Mecloadganj, Himachal Pradesh, India]
I. balsamines (Kaltenbach 1862)	P(c)	16		Blackman and Eastop 2015 [?]
I. impatiens (Shinji, 1922)	?P(c)	16		Blackman 1986 [Japan]
Indoidiopterus geranii (Chowdhuri, R.C. Basu, Chakrabarti, & D.N. Raychaudhuri, 1969)	P(c)	12		Pal and Khuda-Bukhsh 1980, Khuda-Bukhsh and Pal 1986b [Triyuginarayan, Uttarakhand, India]
Indomasonaphis inulae (A.K.Ghosh & Raychaudhuri, 1972)	P(c)	30		Kurl and Chauhan 1986c [Barog, Himachal Pradesh, India]
		32		Kurl and Chauhan 1987a [Barog, Himachal Pradesh, India]
Indomegoura indica (van der Goot, 1916)	P(c)	10		Blackman and Eastop 2006 [?]
		12		Shinji 1927 (as *Amphorophora indicum*), Blackman 1986 [Japan] (based on n(♂) = 6 (Shinji 1927))
Liosomaphis atra Hille Ris Lambers, 1966	?	17		Kurl and Chauhan 1987b [Barog, Himachal Pradesh, India], Kurl and Chauhan 1988 [India]
		18		Kurl and Chauhan 1987a [Barog, Himachal Pradesh, India]
L. berberidis (Kaltenbach, 1843)	P(c)	18		Blackman 1980 [Great Britain]
L. himalayensis A.N. Basu, 1964	?P(c)	18		Pal and Khuda-Bukhsh 1984 [Jamunetri, Uttarakhand, India], Dutta and Gautam 1993 [Shimla, Himachal Pradesh, India]
Lipaphis erysimi (Kaltenbach, 1843)	P(c)	10		Gut 1976 [Holland]
L. fritzmuelleri Börner, 1950	P(c)	10		Blackman and Eastop 2015 [?]

Taxon	Life cycle	2n ♀/♂	Genetic system, ♀/♂	References and collecting data
L. pseudobrassicae (Davis, 1914)	P(c), P(o)	6/5	XX/X0	Fox 1957 [Virginia, USA]
		8		Chen and Zhang 1985a, c (as *L. erysimi*) [Beijing area, China] (Chen and Zhang 1985a cited after Blackman and Eastop 2015), Kar and Khuda-Bukhsh 1991b (as *L. erysimi*) [Kalyani, West Bengal, India]
		8–9		Blackman and Eastop 2015 [?] (anholocyclic populations in most parts of the world have 2n=9)
		8, 10		Gautam and Kapoor 2002 (as *L. erysimi*) [Una, Himachal Pradesh, India]
		8, 9, 10		Feng and You 1988 (as *L. erysimi*) [Taiwan]
		9, 10		Kurl 1986 (as *L. erysimi*) [Meghalaya, India]
		10		Kurl and Misra 1981(as *L. erysimi*) [Jodhpur, Rajasthan, India], Gautam and Sharma 1990 (as *L. erysimi*) [Himachal Pradesh, India], Gautam and Dhatwalia 2003 (as *L. erysimi*) [Shimla, Himachal Pradesh, India]
		4, 5, 6, 7, 8, 9, 10, 15, 18		Khuda-Bukhsh and Pal 1984b (as *L. erysimi*) [Kalyani, West Bengal, India]
Longicaudus trirhodus (Walker,1849)	P(c)	12		Gut 1976 [Holland], Chen and Zhang 1985a [Beijing area, China] (cited after Blackman and Eastop 2015)
Macchiatiella itadori (Shinji, 1924)	P(c)	12/11	XX/X0	Shinji 1927, 1931, 1941a (as *Acaudus*), Blackman 1986 [Japan] (based on n(♂) = 6 (Shinji 1927, 1931))
Macromyzus woodwardiae (Takahashi, 1921)	P(o), ?P(c)	12		Blackman 1986 [Japan]
Macrosiphoniella absinthii (Linnaeus, 1758)	P(c)	12		Sun and Robinson 1966, Robinson and Chen 1969a [Canada]
M. artemisiae (Boyer de Fonscolombe, 1841)	P(c)	12		Gut 1976 [Holland]
M. dimidiata Börner, 1942	P(c)	12		Blackman and Eastop 2006 [?]
M. formosartemisiae Takahashi, 1921	?P(c), P(o)	10		Pal and Khuda-Bukhsh 1980, Khuda-Bukhsh and Pal 1986b [Rambara, Uttarakhand, India]
M. huaidensis G. Zhang, 1980	?	12		Chen and Zhang 1985b (cited after Blackman and Eastop 2015)
M. kikungshana Takahashi, 1937	P(c)	12		Pal and Khuda-Bukhsh 1980, Khuda-Bukhsh and Pal 1986b [Triyuginarayan, Uttarakhand, India]
M. ludovicianae (Oestlund, 1886)	P(c)	12		Robinson and Chen 1969a [Canada]
M. millefolii (De Geer, 1773)	P(c)	12		Gut 1976 [Holland]
M. pseudoartemisiae Shinji, 1933	?	10		Pal and Khuda-Bukhsh 1982, Khuda-Bukhsh and Pal 1986b [Srinagar, Jammu and Kashmir, India], Dutta and Gautam 1993 [Solan, Himachal Pradesh, India]
		12		Kar and Khuda-Bukhsh 1989 [Kalimpong, West Bengal, India] (Blackman and Eastop 2006: "perhaps this was misidentified yomogifoliae?")
M. sanborni (Gillette, 1908)	P(o)	10		Chen and Zhang 1985a [Beijing area, China] (cited after Blackman and Eastop 2015), Chen and Zhang 1985b (cited after Blackman and Eastop 2015)

Taxon	Life cycle	2n ♀/♂	Genetic system, ♀/♂	References and collecting data
M. sanborni (Gillette, 1908)	P(o)	12		Boschetti 1963 [Italia], Blackman and Eastop 2015 [many samples from Great Britain and India], Khuda-Bukhsh and Datta 1981b [India], Gautam and Sharma 1990 [Himachal Pradesh, India], Dutta and Gautam 1993 [Shimla, Himachal Pradesh, India], Blackman and Eastop 2006 [one sample from China]
M. sejuncta (Walker, 1848)	P(c)	10		Blackman 1980 [Great Britain]
M. subterranea (Koch, 1855)	P(c)	12		Gut 1976 (as *Macrosiphoniella trimaculata* Hille Ris Lambers, 1938) [Holland]
M. szalaymarzsoi Szelegiewicz, 1978	?	12		Blackman and Eastop 2006 [?]
M. tanacetaria (Kaltenbach, 1843)	P(c)	12		Sun and Robinson 1966, Robinson and Chen 1969a [Canada]
		12/11	XX/X0	Kuznetsova and Gandrabur 1991 [St. Petersburg, Russia]
M. tapuskae (Hottes & Frison, 1931)	P(c)	12		Blackman and Eastop 2015 [?]
M. yomogifoliae (Shinji, 1922)	?	12		Kulkarni 1984 (as *Macrosiphum yamagopholiae* (Shinji)) [Darjeeling, West Bengal, India]
M. (*Asterobium*) *yomenae* (Shinji, 1922)	?	12		Shinji 1927 (as *Amphorophora*), Blackman 1986 [Japan] (based on n(♂) = 6 (Shinji 1927))
M. (*Chosoniella*) *myohyangsani* Szelegiewicz, 1980	?	12		Chen and Zhang 1985b (cited after Blackman and Eastop 2015)
M. (*Ch.*) *spinipes* A.N. Basu, 1968	?	10		Kar et al. 1990 [India]
M. (*Phalangomyzus*) *antennata* Holman & Szelegiewicz, 1978	?	12		Blackman and Eastop 2006 [?]
M. (*P.*) *grandicauda* Takahashi & Moritsu, 1963	?	12		Chen and Zhang 1985b (cited after Blackman and Eastop 2015)
M. (*P.*) *oblonga* (Mordvilko, 1901)	P(c)	12		Gut 1976 [Holland]
M. (*P.*) *persequens* (Walker, 1852)	P(c)	12		Gut 1976 [Holland]
Macrosiphoniella sp. 1	?	12		Samkaria et al. 2010 [Shimla, Himachal Pradesh, India]
Macrosiphoniella sp. 2	?	12		Chen and Zhang 1985a [Beijing area, China] (cited after Blackman and Eastop 2015)
Macrosiphum albifrons Essig, 1911	P(c)	10		Blackman 1980 [USA]
M. californicum (Clarke, 1903)	P(c)	10		Blackman 1980 [USA]
M. centranthi Theobald, 1915	P(c), ?P(o)	10		Blackman and Eastop 1984 [?]
M. cholodkovskyi (Mordvilko, 1909)	P(c)	10		Blackman and Eastop 2015 [?]
M. claytoniae Jensen, 2000	P(o)	16		Blackman and Eastop 2015 [?]
M. clematifoliae Shinji, 1924	P(c)	18		Blackman 1986 [Japan], Blackman and Eastop 2015 [?] (*the karyotype suggests that this species may be a *Sitobion**)
M. clydesmithi Robinson, 1980	P(c)	16		Blackman and Eastop 2015 [?]
M. cornifoliae (Shinji, 1924)	?P(c)	14/13	XX/X0	Shinji 1927, 1931, 1941a, Blackman 1986 [Japan] (based on 2n male =13 (Shinji 1931))
M. corydalis (Oestlund, 1886)	P(c)	10		Blackman and Eastop 2015 [?]
M. creelii Davis, 1914	?P(c)	10		Blackman and Eastop 2015 [?]
M. daphinidis Börner, 1940	P(c)	10		Blackman and Eastop 2015 [?]
M. dicentrae Jensen & Chan, 2009	P(c)	16		Blackman and Eastop 2015 [?]
M. equiseti (Holman, 1961)	P(c)	16		Blackman and Eastop 2015 [?]

Taxon	Life cycle	2n ♀/♂	Genetic system, ♀/♂	References and collecting data
M. euphorbiae (Thomas, 1878)	P(c), P(o)	10/9	XX/X0	Lawson 1936 (as *M. solanifolii* Ashmead, 1882) [USA], Dionne and Spicer 1957 (as *M. solanifolii*) [Canada], Pagliai 1966 [Italy], Sun and Robinson 1966, Robinson and Chen 1969a [Canada], Gautam and Kapoor 2002 [Shimla, Himachal Pradesh, India], Monti et al. 2011 [Italy]
M. euphorbiellum Theobald, 1917	P(c)	10		Blackman 1980 (as *M. amygdaloides* Theobald, 1925) [Great Britain]
M. funestum (Macchiati, 1885)	P(c)	10		Blackman 1980 [Great Britain]
M. gei (Koch, 1855)	P(c)	10		Gut 1976 [Holland]
M. geranii (Oestlund, 1887)	?	10		Robinson and Chen 1969a [Canada]
M. hamiltoni Robinson, 1968	?	10		Robinson and Chen 1969a [Canada]
M. hellebori Theobald & Walton, 1923	P(c), P(o)	10		Gut 1976 [Holland]
M. impatientis Williams, 1911	P(c)	10		Blackman and Eastop 2015 [?]
M. knautiae Holman 1972	P(c)	12	XX/X0	Voronova et al. 2010 [Byelorussia]
M. manitobense Robinson, 1965	P(c)	10		Sun and Robinson 1966, Robinson and Chen 1969a [Canada]
M. mordvilkoi Miyazaki, 1968	P(c)	10		Blackman 1986 [Japan]
M. occidentalis (Essig, 1942)	P(c)	16		Blackman and Eastop 2015 [?]
M. opportunisticum Jensen, 2012	P(c)	16		Blackman and Eastop 2015 [?]
M. osmaroniae Wilson, 1912	P(c)	16		Blackman and Eastop 2006 [?]
M. pachysiphon Hille Ris Lambers, 1966	?	18		Kurl 1980b [Meghalaya, India], Gautam and Kapoor 2002 [Shimla, Himachal Pradesh, India]
M. pallidum (Oestlund, 1887)	?	10		Robinson and Chen 1969a [Canada], Gautam & Dhatwalia 2003 [Shimla, Himachal Pradesh, India]
M. parvifolii Richards, 1967	?	16		Blackman and Eastop 2015 [?]
M. penfroense Stroyan, 1979	?P(o)	10		Blackman and Eastop 2015 [?]
M. ptericolens Patch, 1919	P(c)	16		Blackman 1980 (as *Sitobion*) [Great Britain; USA]
M. pteridis Wilson, 1915	P(c)	16		Blackman and Eastop 2015 [?]
M. pyrifoliae MacDougall, 1926	?P(c)	10		Blackman and Eastop 2015 [?]
		11		Blackman and Eastop 2015 [?]
		12		Blackman and Eastop 1994 [?]
M. rhamni (Clarke, 1903)	P(c)	16		Blackman and Eastop 2015 [?]
M. rosae (Linnaeus, 1758)	P(c), P(o)	10		Stevens 1905b, 1906, 1909 (as *Aphis*) [USA], Hewitt 1906 (as *Aphis*) [Great Britain], Baehr 1909 (as *Aphis*) [Germany], Cognetti 1961a, b, Cognetti and Cognetti-Varriale 1961 Boschetti and Pagliai 1964, Pagliai 1966 [Italy], Khuda-Bukhsh 1980 [Garhwal, Uttarakhand, India], Raychaudhuri and Das 1987 [India], Kar and Khuda-Bukhsh 1989 [Kalimpong, West Bengal, India], Gautam and Dhatwalia 2003, Samkaria et al. 2010 [Shimla, Himachal Pradesh, India], Reeta Devi and Gautam 2012 [Kullu region, Himachal Pradesh, India]
		12		Kulkarni 1984 [Darjeeling, West Bengal, India]
		14		Stschelkanovzew 1904 (as *Aphis*) [Germany]
M. stanleyi Wilson, 1915	P(c)	16		Blackman and Eastop 1994 [?]
M. stellariae Theobald, 1913	?	10		Blackman 1980 [Great Britain]
M. tenuicauda Bartholomew, 1932	?	10		Blackman and Eastop 2006 [?]

Taxon	Life cycle	2n ♀/♂	Genetic system, ♀/♂	References and collecting data
M. tinctum (Walker, 1849)	P(o)	10		Blackman and Eastop 2015 [?]
M. walkeri Robinson, 1980	P(o), ?P(c)	16		Blackman and Eastop 2015 [?]
M. willamettense Jensen, 2000	P(c)	10		Blackman and Eastop 2006 [?]
M. woodsiae Robinson, 1980	?P(c)	16		Blackman and Eastop 2006 [?]
M. (*Neocorylobium*) *pseudocoryli* Patch, 1919	P(c)	10		Blackman and Eastop 1994 [?]
M. (*Unisitobion*) *perillae* (G. Zhang, 1988)	P(c)	18		Chen and Zhang 1985a [Beijing area, China] (cited after Blackman and Eastop 2015)
Macrosiphum sp.	?	10		Robinson and Chen 1969a [Canada]
Matsumuraja capitophoroides Hille Ris Lambers, 1966	?P(c)	14		Kurl and Chauhan 1986 [Manali, Himachal Pradesh, India]
M. nuditerga Hille Ris Lambers, 1965	?	14		Blackman and Eastop 2015 [?]
M. rubea Sorin, 1965	?	14		Blackman 1986 [Japan]
M. rubi (Matsumura, 1918)	P(c)	14		Blackman 1986 [Japan]
M. rubifoliae Takahashi, 1931	P(c), P(o)	14		Blackman 1986 [Japan]
M. rubiphila Takahashi, 1965	?	14		Blackman and Eastop 2015 [?]
Matsumuraja sp.	?	18		Blackman and Eastop 2006 [?]
Megoura crassicauda Mordvilko, 1919	?	10		Blackman and Eastop 2015 [?]
M. dooarsis (A.K. Ghosh & D.N. Raychaudhuri, 1969)	?	20		Dutta and Gautam 1993 [Shimla, Himachal Pradesh, India]
M. lespedezae (Essig & Kuwana, 1918)	?	12/11	XX/X0	Shinji 1927, 1931 (as *Amphorophora*) , Blackman 1986 [Japan] (based on 2n (♂) =6 (Shinji 1931))
		14		Kulkarni and Kacker 1980, 1981b [India], Blackman and Eastop 1984 [?], Shinji 1941a (as *Myzus lespedezae*), Blackman 1986 [Japan]
M. viciae Buckton, 1876	P(c)	10/9	XX/X0	Manicardi, Gautam et al. 1991 [Italy]
		10		Pagliai 1966, Orlando 1974, 1983 [Italy], Blackman 1986 [Japan]
Melanaphis arundinariae (Takahashi, 1937)	?	8		Khuda-Bukhsh and Pal 1984a [Triyuginarayan, Uttarakhand, India], Kar and Khuda-Bukhsh 1989 [Shillong, Meghalaya, India]
M. bambusae (Fullaway, 1910)	P(c), P(o)	8		Blackman and Eastop 1984 [?], Blackman 1986 [Japan]
		10		Kuznetsova and Shaposhnikov 1973 [Sukhumi, Georgia], Kuznetsova 1974 [?]
		12		Kar et al. 1990 [India]
M. donacis (Passerini, 1861)	P(c)	8		Pal and Khuda-Bukhsh 1980, Khuda-Bukhsh and Pal 1984a [Ghangaria, Uttarakhand, India], Kuznetsova and Shaposhnikov 1973 (as *Longiunguis*) [Kara-Kala, Turkmenistan]
M. japonica (Takahashi, 1919)	P(c)	c.22		Blackman and Eastop 2006 [?]
M. meghalayensis meghalayensis D.N. Raychaudhuri & C. Banerjee, 1974	?	10		Pal and Khuda-Bukhsh 1980, Khuda-Bukhsh and Pal 1984a [Gobindoghat, Uttarakhand, India]
M. pyraria (Passerini, 1861)	P(c)	8		Kuznetsova and Shaposhnikov 1973 (as *Longiunguis*) [Crimea, Ukraine], Gautam and Dhatwalia 2003 [Shimla, Himachal Pradesh, India], Criniti et al. 2009 [Italy]
M. sacchari (Zehntner, 1897)	P(o), ?P(c)	8		Blackman 1980 [India], Blackman 1986 [Hong Kong]
		10		Khuda-Bukhsh and Kar 1990 [Kalyani, West Bengal, India]

Taxon	Life cycle	2n ♀/♂	Genetic system, ♀/♂	References and collecting data
M. sorghi (Theobald, 1904)	P(o), ?P(c)	8		Blackman and Eastop 2015 [?]
Melanaphis sp.	?	22		Blackman 1986 [Japan] (Blackman and Eastop 2015: "a record of 2n=22 for *M. sacchari* in Japan (Blackman 1986) is referable to another, undescribed species")
Metopeurum fuscoviride Stroyan, 1950	P(c)	8		Blackman 1980 [Great Britain]
Metopolophium albidum Hille Ris Lambers, 1947	P(c)	16		Blackman and Eastop 2006 [?]
M. dirhodum (Walker, 1849)	P(c), P(o)	16, 18		Rubín de Celis et al. 1997 [Brazil]
		18		Sun and Robinson 1966 (as *Acyrthosiphon*), Robinson and Chen 1969a [Canada], De Barro 1992 [Australia]
M. fasciatum Stroyan, 1982	P(o), ?P(c)	18		Blackman and Eastop 2015 [?]
M. festucae festucae (Theobald, 1917)	P(c), P(o)	16		Blackman and Eastop 1984 [?]
M. f. cerealium Stroyan, 1982	P(c), P(o)	16		Blackman and Eastop 1984 [?]
M. frisicum Hille Ris Lambers, 1947	P(c)	16		Blackman 1980 [Great Britain]
Metopolophium sp.	?	16		Kar et al. 1990 [India] (possible *Acyrthosiphum*)
Microlophium carnosum (Buckton, 1876)	P(c)	16		Kuznetsova and Shaposhnikov 1973 (as *M. evansi* (Theobald, 1923) [Crimea, Ukraine]
		18		Robinson and Chen 1969a [Canada]
		20		Blackman 1980 [Great Britain], Blackman 2010 [?]
M. rubiformosanum (Takahashi, 1927)	?	12		Pal and Khuda-Bukhsh 1982, Khuda-Bukhsh and Pal 1986b (as *Acyrthosiphum*) [Srinagar, Jammu and Kashmir, India]
Microlophium ?sibiricum tenuicauda Hille Ris Lambers, 1949	?	18		Blackman 1980 [North America]
Microlophium sp.	?	16		Blackman and Eastop 2006 [?] ("This is possibly the species with 2n=16 from Crimea listed as *M. evansi* Theobald by Kuznetsova and Shaposhnikov (1973)), Blackman 2010 [Great Britain]
Micromyzella filicis (van der Goot, 1917)	?	36		Blackman and Eastop 2015 [New Zealand]
Micromyzodium filicium David, 1958	?	12		Kar et al. 1990 [India]
M. spinulosum Miyazaki, 1971	?	10		Blackman 1986 [Japan]
Micromyzus nikkoensis Miyazaki, 1968	?	12		Blackman 1986 [Japan]
Microsiphum woronieckae Judenko, 1931	P(c)	12		Blackman and Eastop 2006 [?]
Muscaphis escherichi irae (Shaposhnikov, 1963)	P(c)	12		Kuznetsova 1968 (as *Toxopterella drepanosiphoides irae* Shaposhnikov, 1963) [St. Petersburg, Russia]
Myzakkaia verbasci (Chowdhuri, R.C. Basu, Chakrabarti & D.N. Raychaudhuri, 1969)	?	12		Kurl and Chauhan 1986a,1987a [Manali, Himachal Pradesh, India]
Myzaphis bucktoni (Jacob, 1946)	P(c)	13		Blackman and Eastop 2006 [one sample from Portugal]
M. rosarum (Kaltenbach, 1843)	P(c), P(o)	4		MacDonald and Harper 1965, Harper and MacDonald 1968 [Canada], Chen and Zhang 1985a [Beijing area, China] (cited after Blackman and Eastop 2015), Dutta and Gautam 1993 [Shimla, Himachal Pradesh, India], Reeta Devi and Gautam 2012 [Kullu region, Himachal Pradesh, India]

Taxon	Life cycle	2n ♀/♂	Genetic system, ♀/♂	References and collecting data
Myzus cerasi (Fabricius, 1775)	P(c)	10		Sun and Robinson 1966, Robinson and Chen 1969a [Canada], Kurl and Chauhan 1986d, 1987a [Solan, Himachal Pradesh, India], Bizzaro et al. 1999 [Italy], Blackman and Eastop 2015 [European and North American populations]
M. c. umefoliae (Shinji, 1924)	P(c)	12		Khuda-Bukhsh and Pal 1986a (as *Myzus cerasi*, but Blackman and Eastop 2015 - "possibly *M. umefoliae*") [Garhwal, Uttarakhand, India]
M. dycei Carver, 1961	?	12		Kurl and Chauhan 1986d,1987a [Solan, Himachal Pradesh, India], Kar et al. 1990 [India]
M. fataunae Shinji, 1924	P(c)	8		Blackman 1986 [Japan]
M. formosanus Takahashi, 1923	?	12		Pal and Khuda-Bukhsh 1980 [Sonprayag, Uttarakhand, India], Khuda-Bukhsh and Pal 1986a [Garhwal, Uttarakhand, India]
M. hemerocallis Takahashi, 1921	?	8		Chen and Zhang 1985a [Beijing area, China] (cited after Blackman and Eastop 2015)
		12		Blackman and Eastop 2006 [China; Kenya; Brazil]
M. lythri (Schrank, 1801)	P(c)	12		Kuznetsova and Shaposhnikov 1973 (as *M. (Nevskia) lithri* Schr.) [Crimea, Ukraine]
M. mumecola (Matsumura, 1917)	?	12		Chen and Zhang 1985a [Beijing area, China] (cited after Blackman and Eastop 2015), Khuda-Bukhsh and Pal 1986a [Garhwal, Uttarakhand, India]
M. obtusirostris S.K. David, Narayanan & Rajasingh, 1971	?P(c)	12		Kurl and Chauhan 1987a [Barog, Himachal Pradesh, India]
M. ornatus Laing, 1932	P(o), ?P(c)	12		Blackman 1980 [Great Britain], Dutta and Gautam 1993 [Shimla, Himachal Pradesh, India], Kapoor and Gautam 1994 [Himachal Pradesh, India]
M. sorbi Bhattacharya & Chakrabarti ex Maity, Bhattacharya & Chakrabarti, 1982	P(c)	12		Khuda-Bukhsh and Pal 1983a [Garhwal, Uttarakhand, India]
M. varians Davidson, 1912	P(c)	12		Blackman 1980 [Great Britain], Bizzaro et al. 1999 [Italy]
		13		Blackman 1980 [USA]
M. (Nectarosiphon) ajugae Schouteden, 1903	P(c)	12		Gut 1976 [Holland]
M. (N.) antirrhinii (Macchiati, 1883)	P(o), ?P(c)	11, 12, 13		Hales et al. 2000 [Australia]
		11, 12, 13, 14		Wilson et al. 2003 [Great Britain; France; Canada; Australia], Blackman and Eastop 2015 [?]
		13		Blackman and Spence 1996 (clone) [Great Britain], Hales 1993 [Australia]
		13, 14		Blackman 1987b [Europe; North America], Spence et al. 1998, Terradot et al. 1999 [Great Britain]
M. (N.) asteriae Shinji, 1941	?	12		Blackman 1986 [Japan]
M. (N.) certus (Walker, 1843)	P(c), P(o)	12		Gut 1976 [Holland], Blackman 1987b [?], Spence et al. 1998 [Great Britain, USA]
M. (N.) dianthicola Hille Ris Lambers, 1966	P(o)	14 (heterozy--gous)		Blackman 1980 [Great Britain; New Zealand], Blackman 1987b [?]
M. (N.) icelandicus Blackman, 1986	P(c)	10		Blackman and Eastop 2015 [?]
M. (N.) ligustri (Mosley, 1841)	P(c)	12		Blackman 1980 [Great Britain]
M. (N.) myosotidis (Börner, 1950)	P(c)	12		Gut 1976 [Holland]

Taxon	Life cycle	2n ♀/♂	Genetic system, ♀/♂	References and collecting data
		8		Chattopadhyay and Raychaudhuri 1980 [Kolkata, West Bengal, India]
		8, 12, 13		Raychaudhuri and Das 1987 [India]
		10, 11,12		Misra and Kurl 1983 [Jodhpur, Rajasthan, India]
		10, 11,12, 13		Khuda-Bukhsh 1980 (as *Macrosiphum*) [Garhwal, Uttarakhand , India], Kurl 1986 [Meghalaya, India]
		11, 12		Hales 1993 [Australia], Spence and Blackman 2000 [clon]
		11, 12, 13		Spence et al. 1998 [France; Great Britain; lab. cultures]
		11, 12, 18 (triploid)		Yang and Zhang 2000, Yang et al. 2000 [China]
		12/11	XX/X0	Hales and Mittler 1983, 1987 [Australia], Searle and Mittler 1991 [Washington, USA]
M. (*N.*) *persicae persicae* (Sulzer, 1776)	P(c), P(o)	12		Shinji 1941b [Japan], Colling 1955 [Great Britain], Dionne and Spicer 1957 (as *M. solanifolii*), Sun and Robinson 1966, Robinson and Chen 1969a [Canada], Kuznetsova 1969 (as *Myzodes*) [Alma-Ata, Kazakhstan], Kuznetsova and Shaposhnikov 1973 (as *Myzodes*) [St. Petersburg, Russia], Kulkarni and Kacker 1980,1981b [India], Chen and Zhang 1985a [Beijing area, China] (cited after Blackman and Eastop 2015), Blackman 1986 [Japan] (based on 2n (♂) =6 (Shinji 1941b)), Khuda-Bukhsh and Pal 1986a [Garhwal, Uttarakhand, India], Blackman 1987b [?], Kar et al. 1990 [India], Gautam and Sharma 1990 [Himachal Pradesh, India], Dutta and Gautam 1993 [Shimla, Himachal Pradesh, India], Blackman and Spence 1996 [Great Britain], Spence and Blackman 1998 [Great Britain], Terradot et al. 1999 [Great Britain; France; Spain; Cuba], Wilson et al. 2002 [Australia], Gautam and Dhatwalia 2003 [Solan, Himachal Pradesh, India], Samkaria et al. 2010 [Palampur, Himachal Pradesh, India], Jangra et al. 2014 [Jammu and Kashmir, India]
		12, 13		Blackman and Takada 1976, 1977, Blackman 1986 [Japan],
		12, 14		Sethi and Nagaich 1972 [Shimla, Himachal Pradesh, India]
		12, 13, 14		Blackman 1971 (as *Myzodes*) [Great Britain; France], Blackman, Brown and Eastop 1987 [Europe; Japan; USA], Monti et al. 2012a [Italy; Great Britain], Rivi et al. 2012 [Italy]
		14		Cognetti 1961a, b (as *Myzodes*), Cognetti and Cognetti-Varriale 1961 [Italy]
		12, 13, 14, 15, 16, 17		Monti et al. 2012b [clone from Hertfordshire, Great Britain]
		12/11, 11, 12, 13, 14, 18 (triploid)	XX/X0	Blackman 1980 [Europe; Japan; USA; Chile; New Zealand]
		12		Blackman 1987b [North America], Harlow et al. 1991 [North Carolina, USA], Dutta and Gautam 1993 [Shimla, Himachal Pradesh, India], Terradot et al. 1999 [France]
M. (*N.*) *persicae nicotianae* Blackman, 1987	P(c), P(o)	18 (triploid)		Takada et al. 1978 [Japan]

Taxon	Life cycle	2n ♀/♂	Genetic system, ♀/♂	References and collecting data
M. (*Sciamyzus*) *ascalonicus* Doncaster, 1946	P(o)	12		Gut 1976 [Holland], Blackman 1987b [?], Kapoor and Gautam 1994 [Shimla, Himachal Pradesh, India], Blackman and Spence 1996 [Great Britain], Gautam and Dhatwalia 2003 [Solan, Himachal Pradesh, India]
M. (*S.*) *cymbalariae* Stroyan, 1954	P(o), ?P(c)	12		Blackman 1980 [Great Britain], Blackman 1987b [?]
Myzus sp. 1	?	10		Khuda-Bukhsh and Pal 1986a [Garhwal, Uttarakhand, India]
Myzus sp. 2	?	12		Khuda-Bukhsh and Kar 1990 [Kalimpong, West Bengal, India]
Myzus sp. 3	?	12		Kar et al. 1990 [India]
Nasonovia compositellae nigra (Hille Ris Lambers, 1931)	P(o), P(c)	11 (heterozygous)		Blackman 1980 (as *N. nigra* (Hille Ris Lambers, 1931)) [Great Britain], Blackman and Eastop 2006 [Great Britain] (one sample)
N. jammuensis Verma, 1966	?	12		Dutta and Gautam 1993 [Shimla, Himachal Pradesh, India]
N. ribisnigri (Mosley, 1841)	P(c)	12		Blackman 1980 [Great Britain]
		14		Shinji 1941a (as *Amphorophora ribicola*) [Japan]
N. rostrata David & Hameed, 1974	P(c)	12		Pal and Khuda-Bukhsh 1980, Khuda-Bukhsh and Pal 1986b [Triyuginarayan, Uttarakhand, India]
N. (*Kakimia*) *alpina* (Gillette & Palmer, 1928)	?	10		Blackman and Eastop 2015 [?]
N. (*K.*) *aquilegiae* (Essig, 1917)	P(c)	10		Sun and Robinson 1966, Robinson and Chen 1969a (as *Kakimia essigi* (Gillette & Palmer, 1928)) [Canada]
N. (*K.*) *cynosbati* (Oestlund, 1887)	P(c)	10		Sun and Robinson 1966, Robinson and Chen 1969a (as *Kakimia* and as *Kakimia thomasi* (Hottes & Frison 1931)) [Canada]
N. (*K.*) *dasyphylli* Stroyan, 1957	P(c), P(o)	12 (heterozygous)		Blackman and Eastop 2006 [Great Britain] (one sample)
Nearctaphis bakeri (Cowen, 1895)	P(c), P(o)	12		Blackman 1980 [Great Britain], Dutta and Gautam 1993 [Shimla, Himachal Pradesh, India]
N. californica Hille Ris Lambers, 1970	?P(c)	12		Blackman and Eastop 1994 [?]
Neoceruraphis viburnicola (Gillette, 1909)	P(c)	14		Sun and Robinson 1966, Robinson and Chen 1969a [Canada]
Neomyzus circumflexus (Buckton, 1876)	P(o)	8		Blackman 1980 [Great Britain], Dutta and Gautam 1993 [Shimla, Himachal Pradesh, India], Gautam and Dhatwalia 2003 [Hamirpur, Himachal Pradesh, India]
		10		Kar and Khuda-Bukhsh 1986, Khuda-Bukhsh and Kar 1990 [Kalimpong, West Bengal, India]
N. parthenocissi (Takahashi, 1965)	?	12		Blackman 1986 (as *Aulacorthum* (*Neomyzus*)) [Japan]
N. parthenocissi (Takahashi, 1965)	?	12		Blackman 1986 (as *Aulacorthum* (*Neomyzus*)) [Japan]
Neotoxoptera formosana (Takahashi, 1921)	P(o)	12		Blackman and Eastop 1984 [?]
N. violae (Pergande, 1900)	?	12		Blackman and Eastop 1984 (as *Neotoxoptera oliveri* (Essig, 1935)) [?]
Obtusicauda coweni (Hunter, 1901)	P(c)	12		Blackman and Eastop 2006 [?]
Oedisiphum soureni A.N. Basu, 1964	?	8		Kurl and Chauhan 1986c [Barog, Himachal Pradesh, India]
Ovatomyzus boraginacearum Eastop, 1952	P(o)	12		Gut 1976 [Holland]
O. stachyos Hille Ris Lambers, 1947	?P(o)	12		Blackman and Eastop 2006 [?]

Taxon	Life cycle	2n ♀/♂	Genetic system, ♀/♂	References and collecting data
Ovatus crataegarius (Walker, 1950)	P(c), P(o)	12		Shinji 1941a (as *Phorodon menthae*) [Japan], Blackman and Eastop 1984 [?], Chen and Zhang 1985a [Beijing area, China] (cited after Blackman and Eastop 2015), Blackman 1986 [Japan] (based on 2n (♂) =6 (Shinji 1941a)), Gautam and Dhatwalia 2003 [Shimla, Himachal Pradesh, India]
O. insitus (Walker, 1849)	P(c)	12/11	XX/X0	Kuznetsova and Shaposhnikov 1973 [St. Petersburg, Russia]
O. malisuctus (Matsumura, 1918)	P(c)	12		Chen and Zhang 1985a (as *Myzus*) [Beijing area, China] (cited after Blackman and Eastop 2015)
Paczoskia obtecta Börner, 1950	?	12		Blackman 1980 [Sweden]
Paradoxaphis aristoteliae Sunde, 1988	P(c)	8		Blackman and Eastop 2015 [?]
Paramyzus longirostris Miyazaki, 1971	?	14		Blackman 1986 [Japan]
Pentalonia kalimpongensis (A.N. Basu, (1967) 1968)	P(c)	12		Khuda-Bukhsh and Kar 1990 [Kalimpong, West Bengal, India]
P. nigronervosa Coquerel, 1859	P(o), ?P(c)	14		Blackman and Eastop 1984 [?], Panigrahy and Patnaik 1987 [Chatrapur, Odisha, India], Khuda-Bukhsh and Kar 1990 [Kalyani, West Bengal, India]
Phorodon cannabis Passerini, 1860	P(c)	12		Pal and Khuda-Bukhsh 1980, Khuda-Bukhsh and Pal 1986b [Triyuginarayan, Uttarakhand, India], Dutta and Gautam 1993 [Shimla, Himachal Pradesh, India]
P. humuli humuli (Schrank, 1801)	P(c)	12		Kuznetsova and Shaposhnikov 1973 (as *Ph. pruni* Geoffr.) [Crimea, Ukraine], Blackman 1980 [Great Britain]
P. h. japonensis Takahashi, 1965	P(c)	12		Shinji 1941a [Japan], Blackman and Eastop 1984 [?], Chen and Zhang 1985a [Beijing area, China] (cited after Blackman and Eastop 2015), Blackman 1986 [Japan] (their own data and based on n(♂) = 6 (Shinji 1941a))
P. humulifoliae Tseng & Tao, 1938	?P(c)	12		Chen and Zhang 1985b (cited after Blackman and Eastop 2015)
Pleotrichophorus duponti Hille Ris Lambers, 1935	P(c)	14		Blackman 1980 [Great Britain]
P. glandulosus (Kaltenbach, 1846)	P(c)	14		Blackman 1980 [Great Britain]
Plocamaphis flocculosa (Weed, 1891)	P(c)	30–34?		Kuznetsova and Shaposhnikov 1973 [St. Petersburg, Russia]
Protaphis knowltoni (Hottes & Frison, 1931)	P(c)	8		Sun and Robinson 1966, Robinson and Chen 1969a (as *Aphis*) [Canada]
P. middletonii (Thomas, 1879)	P(c), ?P(o)	8		Blackman 1980 (as *Aphis armoraciae* Cowen, 1895) [USA]
		8, 9		Blackman 1980 (as *Aphis* (*Protaphis*) *maidiradicis* Forbes, 1891) [USA]
P. pseudocardui (Theobald, 1915)	?	8		Blackman and Eastop 2015 [?]
P. terricola (Rondani, 1847)	P(c)	8		Blackman 1980 (as *Aphis* (*Protaphis*)) [Spain]
Protaphis sp.	?	8, 9		Blackman 1980 (as *Aphis* (*Protaphis*)) [Iran] (from *Artemisia dracunculus*)
Pseudocercidis rosae Richards, 1961	P(c)	12		Robinson and Chen 1969a [Canada]
Pseudomegoura magnoliae (Essig & Kuwana, 1918)	P(o), P(c)	12		Blackman 1986 [Japan] (their own data ex. cult. on potato and based on n(♂) = 6 (Shinji 1927))
Pterocomma bicolor (Oestlund, 1887)	P(c)	8		Robinson and Chen 1969a [Canada]
P. jacksoni Theobald, 1921	?	30–34?		Kuznetsova and Shaposhnikov 1973 [St. Petersburg, Russia]

Taxon	Life cycle	2n ♀/♂	Genetic system, ♀/♂	References and collecting data
P. konoi Hori, 1939	P(c)	8		Blackman 1986 [Japan]
P. pilosum Buckton, 1879	P(c)	8		Kuznetsova and Shaposhnikov 1973 [St. Petersburg, Russia]
P. populeum (Kaltenbach, 1843)	P(c)	8		Kuznetsova and Shaposhnikov 1973 [St. Petersburg, Russia]
P. rufipes (Hartig, 1841)	P(c)	8		Kuznetsova and Shaposhnikov 1973 (as *P. steinheili* Mordvilko, 1901) [St.Petersburg, Russia]
		8, 9		Kuznetsova 1974 (as *steinheili* Mordv.) [?]
P. salicis (Linnaeus, 1758)	P(c)	6		Tannreuther 1907 [USA]
		30-34?		Kuznetsova and Shaposhnikov 1973 [St. Petersburg, Russia]
		58		Blackman 1980 [Great Britain], Blackman and Eastop 1994 [?]
P. salijaponica (Shinji, 1924)	?	8/7	XX/X0	Shinji 1931 (as *Melanoxantherium*) [Japan], Blackman 1986 (as *Plocamaphis*) [Japan] (based on n(♂) = 4 (Shinji 1931))
		22		Shinji 1927, 1941a (as *Melanoxantherium*), Blackman 1986 (as *Plocamaphis*) [Japan] (based on n(♂) = 11 (Shinji 1927, 1941))
P. sanguiceps Richards, 1967	?	8		Blackman and Eastop 1994 [?]
P. smithiae (Monell, 1879)	P(c)	8		Sun and Robinson 1966, Robinson and Chen 1969a [Canada]
P. tremulae Börner, 1940	?	8		Kuznetsova and Shaposhnikov 1973 [St. Petersburg, Russia]
P. yezoense (Hori, 1929)	P(c)	8		Blackman and Eastop 1994 [?]
Rhodobium porosum (Sanderson, 1900)	P(c), P(o)	14		Kar et al. 1990 [India]
Rhopalomyzus (*Judenkoa*) *lonicerae* (Siebold, 1839)	P(c)	12		Sun and Robinson 1966, Robinson and Chen 1969a [Canada]
Rhopalosiphoninus hydrangeae (Matsumura, 1918)	P(c)	12		Shinji 1941a [Japan]
Rh. latysiphon (Davidson, 1912)	P(o), ?P(c)	6 (+1)		Gut 1976 [Holland]
Rh. tiliae (Matsumura, 1918)	P(c)	12		Shinji 1941a (as *Rh. adenocauli*), 1941b (as *Rh. nobukii*), Blackman 1986 [Japan] (based on n(♂) = 6 (Shinji 1941b)]
Rh. (*Neorhopalosiphoninus*) *staphyleae* (Koch, 1854)	P(c), P(o)	10		Blackman and Eastop 2015 [?]
Rhopalosiphum cerasifoliae (Fitch, 1855)	P(c)	8		Robinson and Chen 1969a [Canada]
Rh. enigmae Hottes & Frison, 1931	P(c)	10		Blackman and Eastop 2006 [?]
Rh. maidis (Fitch, 1856)	P(o), ?P(c)	8		Sun and Robinson 1966, Robinson and Chen 1969a [Canada], Mayo and Starks 1972 [USA], Kurl 1978 [Jodhpur, Rajasthan, India], Kar and Khuda-Bukhsh 1989 [Kalimpong, West Bengal, India], Dutta and Gautam 1993, Gautam and Dhatwalia 2003 [Shimla, Himachal Pradesh, India], Samkaria et al. 2010 [Palampur, Himachal Pradesh, India]
		8, 9		Blackman 1980, Hales and Cowen 1990 [Australia], Kuznetsova and Gandrabur 1991 [Fergana, Uzbekistan], De Barro 1992 [Australia]
		8,10		Chattopadhyay et al. 1982 [India], Panigrahy and Patnaik 1991 [Chatrapur, Odisha, India]

Taxon	Life cycle	2n ♀/♂	Genetic system, ♀/♂	References and collecting data
		8, 9, 10		Blackman et al. 1990, Blackman and Brown 1991 [USA], Jauset et al. 2000 [Catalonia, Spain]
		8, 9, 10, 11		Blackman, Brown and Eastop 1987 [Europe; North America; Iran; Israel; Australia (Tasmania)], Brown and Blackman 1988 [all continents except Antarctica] ("there is an association between karyotype and host plant, the barley-colonizing form in the northern hemisphere having 2n = 10, whereas populations on maize and sorghum have 2n = 8")
		9, 10, 11		Kuznetsova and Gandrabur 1991 [St. Petersburg, Russia]
Rh. nymphaeae (Linnaeus, 1761)	P(c)	8		Kuznetsova and Shaposhnikov 1973 [Tbilisi, Georgia], Blackman and Eastop 2006 [Italy]
		16		Behura and Bohidar 1978 [India] (cited after Blackman and Eastop 2015), Kurl 1978 [Meerut, Uttar Pradesh, India],
		16, 17		Kurl 1986 [Meghalaya, India]
Rh. oxyacanthae (Schrank, 1801)	P(c)	10		Sun and Robinson 1966, Robinson and Chen 1969a, b (as *Rh. fitchii* (Sanderson, 1902)) [Canada], Kuznetsova and Shaposhnikov 1973 (as *Rh. insertum* Walk.) [St.Petersburg, Russia], Kuznetsova et al. 1988 (as *Rh. insertum* Walk.) [St. Petersburg, Russia], Hales and Cowen 1990 (as *Rh. insertum* Walk.) [Australia]
Rh. padi (Linnaeus, 1758)	P(c), P(o)	8/7	XX/X0	Fox 1957 [Pennsylvania, USA]
		8		Sun and Robinson 1966, Robinson and Chen 1969a, b [Canada], Mayo and Starks 1972 [USA], Chen and Zhang 1985a [Beijing area, China] (cited after Blackman and Eastop 2015), Kurl and Misra 1979 [Rajasthan, India], Kar and Khuda-Bukhsh 1989 [Kalimpong, West Bengal, India], Kuznetsova and Gandrabur 1991 [St.Petersburg, Russia], De Barro 1992 [Australia], Valenzuela et al. 2009 [Victoria, Australia], Monti et al. 2010 [Italy]
		8, 9		Hales and Cowen 1990 [Australia]
Rh. padiformis Richards, 1962	?P(c)	10		Blackman and Eastop 1984 [?]
Rh. rufiabdominale (Sasaki, 1899)	P(c), P(o)	8		Gut 1976 [Holland], Khuda-Bukhsh and Kar 1990 [Kalyani, West Bengal, India], Hales and Cowen 1990 [Australia]
Rh. rufulum Richards, 1960	P(c), ?P(o)	8		Gut 1976 [Holland]
Rhopalosiphum sp.	?	8		Bulman et al. 2004 [New Zealand]
Rhopalosiphum sp. ["undescribed species"]	?	9		Hales and Cowen 1990 (similar to *R. padi*) [Australia], Valenzuela et al. 2009 [Victoria, Australia]
Rhopalosiphum sp.["near *insertum*"]	?	10		Valenzuela et al. 2009 [Victoria, Australia]
Roepkea marchali (Börner, 1931)	P(c)	12		Kuznetsova 1968 [Georgia]
Sappaphis piri Matsumura, 1918	P(c)	12		Kuznetsova 1968 [Vladivostok, Russia]
S. sinipiricola G. Zhang, 1980	?	12		Chen and Zhang 1985a [Beijing area, China] (cited after Blackman and Eastop 2015)

Taxon	Life cycle	2n ♀/♂	Genetic system, ♀/♂	References and collecting data
Schizaphis graminum (Rondani, 1847(1852))	P(c), P(o)	6, 8		Rubín de Celis et al. 1997 [Brazil]
		7, 8, 12		Mayo and Starks 1972 [USA]
		8		Sun and Robinson 1966, Robinson and Chen 1969a [Canada], Kuznetsova and Gandrabur 1991 [Ukraine]
		8	XX/X0	Mandrioli et al. 1999 [Modena, Italia]
S. mali Shaposhnikov, 1979	P(c)	8		Blackman and Eastop 2006 [?]
S. piricola (Matsumura, 1917)	P(c)	8		Chen and Zhang 1985a [Beijing area, China] (cited after Blackman and Eastop 2015)
S. rotundiventris (Signoret, 1860)	P(c), P(o)	8		Blackman and Eastop 2006 [?]
S. (*Paraschizaphis*) *acori* (Shinji)	P(c)	8		Blackman and Eastop 2006 [?]
S. (*P.*) *rosazevedoi* (Ilharco, 1961)	P(o)	8		Blackman and Eastop 2006 [?]
S. (*P.*) *scirpi* (Passerini, 1874)	P(c)	8		Gut 1976 (as *Paraschizaphis*) [Holland]
Semiaphis heraclei (Takahashi, 1921)	P(c)	8		Blackman and Eastop 1984 [?],Chen and Zhang 1985a [Beijing area, China] (cited after Blackman and Eastop 2015), Blackman 1986 [Japan], Gautam and Kapoor 2002 [Una, Himachal Pradesh, India]
		10		Pal and Khuda-Bukhsh 1983 [Garhwal, Uttarakhand, India]
Shinjia orientalis (Mordvilko, 1929)	P(c), ?P(o)	12		Shinji 1941b (as *Microtarsus pterydifoliae*), Blackman 1986 [Japan] (based on n(♂) = 6 (Shinji 1941b)), Blackman and Eastop 2006 [?]
Sinomegoura citricola (van der Goot, 1917)	P(o)	12		Kulkarni 1984 [Darjeeling, West Bengal, India], Dutta and Gautam 1993 [Shimla, Himachal Pradesh, India]
		16		Chen and Zhang 1985b (cited after Blackman and Eastop 2015)
		18		Kar and Khuda-Bukhsh 1986, Khuda-Bukhsh and Kar 1990 [Kalimpong, West Bengal, India]
S. photiniae (Takahashi, 1936)	?	18		Khuda-Bukhsh and Kar 1990 [Kalyani, West Bengal, India]
S. pyri A.K. Ghosh & D.N. Raychaudhuri, 1968	?	8		Kar et al. 1990 [India]
S. rhododendri (Takahashi, 1937)	?	18		Gautam and Kumar 2006 [Shimla, Himachal Pradesh, India]
Sitobion alopecuri (Takahashi, 1921)	P(c)	18		Blackman and Eastop 2015 [British Columbia]
S. aulacorthoides (David, Narayanan & Rajasingh, (1970) 1971)	?	18		Blackman and Eastop 2015 [?]
S. avenae (Fabricius, 1775)	P(c), P(o)	18		Sun and Robinson 1966, Robinson and Chen 1969a (as *Macrosiphum*) [Canada], Kuznetsova and Shaposhnikov 1973 [Crimea, Ukraine], Kuznetsova and Gandrabur 1991 [St.Petersburg, Russia], Rubín de Celis et al. 1997 [Brazil]
S. fragariae (Walker, 1848)	P(c)	18		Kuznetsova and Shaposhnikov 1973 [Crimea, Ukraine], Gautam and Kapoor 2002 [Una, Himachal Pradesh, India]
S. graminis Takahashi, 1950	?P(o)	18		Kurl and Chauhan 1986a (as *Macrosiphum*) [Jwalaji, Himachal Pradesh, India]
S. gravelii (van der Goot, 1917)	?P(c)	12		Khuda-Bukhsh and Basu 1987 (as *M. spinotibium* on *Artemisia vulgaris*) (cited after Blackman and Eastop 2015)
S. ibarae (Matsumura, 1917)	?P(o)	14/13		Shinji 1941a (as *Macrosiphum*) [Japan]
S. indicum A.N. Basu, 1964	P(o)	17, 18		Kurl 1986 (as *Macrosiphum*) [Meghalaya, India]
		18		Kurl 1980b (as *Macrosiphum*) [Meghalaya, India]

Taxon	Life cycle	2n ♀/♂	Genetic system, ♀/♂	References and collecting data
S. luteum (Buckton, 1876)	P(o)	12		Gut 1976 [Holland]
S. miscanthi (Takahashi, 1921)	P(o), ?P(c)	14		Kurl and Chauhan 1986a (as *Macrosiphum*) [Solan, Himachal Pradesh, India]
		18		Kurl and Chauhan 1987a (as *Macrosiphum*) [Solan, Himachal Pradesh, India], Dutta and Gautam 1993 [Shimla, Himachal Pradesh, India]
		17, 18		Turak and Hales 1990 [Australia]
		17, 18, 20		Hales et al. 1990, Sunnucks and Hales 1996, Hales et al. 2010 [Australia]
		17, 18, 20, 21		Sunnucks et al. 1996, Hales et al. 1998 [Australia]
		17, 18, 20, 22		Wilson et al. 1999 [New Zealand]
S. nigrinectarium (Theobald, 1915)	?	18		Blackman 1980 [Kenya]
S. ochnearum (Eastop, 1959)	?	18		Blackman and Eastop 2006 [?]
S. pseudoluteum A.K. Ghosh, 1969	?	18		Kar et al. 1990 [India]
S. rosaeiformis (Das, 1918)	P(c)	14, 18		Gautam and Dutta 1994 [Shimla, Himachal Pradesh, India]
		16, 17,18		Kurl 1986 (as *Macrosiphum* (*Sitobion*)) [Meghalaya, India]
		18		Khuda-Bukhsh 1980 (as *Macrosiphum*) [Garhwal, Uttarakhand, India], Kulkarni and Kacker 1981a [Kursiong, West Bengal, India], Kurl and Misra 1983 (as *Macrosiphum* (*S.*) *rosaeformis*) [Jodhpur, Rajasthan, India], Raychaudhuri and Das 1987 [India], Kar and Khuda-Bukhsh 1989 [Shillong, Meghalaya, India], Kar et al. 1990 [India]
S. rosivorum (G. Zhang, 1980)	?	18		Chen and Zhang 1985a (as *Macrosiphum*) [Beijing area, China] (cited after Blackman and Eastop 2015)
S. takahashii (Eastop, 1959)	?	18		Khuda-Bukhsh and Kar 1989a (cited after Blackman and Eastop 2015)
S. wikstroemiae (Mamet, 1939)	?	16		Blackman 1980 [Kenya]
Sitobion sp. prope *avenae* (Fabricius, 1775)	?	12		Kapoor Gautam 1994 [Shimla, Himachal Pradesh, India]
S. luteum (Buckton, 1876)	P(o)	12		Gut 1976 [Holland]
S. miscanthi (Takahashi, 1921)	P(o), ?P(c)	14		Kurl and Chauhan 1986a (as *Macrosiphum*) [Solan, Himachal Pradesh, India]
		18		Kurl and Chauhan 1987a (as *Macrosiphum*) [Solan, Himachal Pradesh, India], Dutta and Gautam 1993 [Shimla, Himachal Pradesh, India]
		17, 18		Turak and Hales 1990 [Australia]
		17, 18, 20		Hales et al. 1990, Sunnucks and Hales 1996, Hales et al. 2010 [Australia]
		17, 18, 20, 21		Sunnucks et al. 1996, Hales et al. 1998 [Australia]
		17, 18, 20, 22		Wilson et al. 1999 [New Zealand]
S. nigrinectarium (Theobald, 1915)	?	18		Blackman 1980 [Kenya]
S. ochnearum (Eastop, 1959)	?	18		Blackman and Eastop 2006 [?]
S. pseudoluteum A.K. Ghosh, 1969	?	18		Kar et al. 1990 [India]

Taxon	Life cycle	2n ♀/♂	Genetic system, ♀/♂	References and collecting data
S. rosaeiformis (Das, 1918)	P(c)	14, 18		Gautam and Dutta 1994 [Shimla, Himachal Pradesh, India]
		16, 17,18		Kurl 1986 (as *Macrosiphum* (*Sitobion*)) [Meghalaya, India]
		18		Khuda-Bukhsh 1980 (as *Macrosiphum*) [Garhwal, Uttarakhand, India], Kulkarni and Kacker 1981a [Kursiong, West Bengal, India], Kurl and Misra 1983 (as *Macrosiphum* (*S.*) *rosaeformis*) [Jodhpur, Rajasthan, India], Raychaudhuri and Das 1987 [India], Kar and Khuda-Bukhsh 1989 [Shillong, Meghalaya, India], Kar et al. 1990 [India]
S. rosivorum (G. Zhang, 1980)	?	18		Chen and Zhang 1985a (as *Macrosiphum*) [Beijing area, China] (cited after Blackman and Eastop 2015)
S. takahashii (Eastop, 1959)	?	18		Khuda-Bukhsh and Kar 1989a (cited after Blackman and Eastop 2015)
S. wikstroemiae (Mamet, 1939)	?	16		Blackman 1980 [Kenya]
Sitobion sp. prope *avenae* (Fabricius, 1775)	?	12		Kapoor and Gautam 1994 [Shimla, Himachal Pradesh, India]
Sitobion sp. prope *fragariae* (Walker, 1848)	?	18		Turak and Hales 1990, Hales et al. 1990, De Barro 1992, Sunnucks et al. 1996, Hales et al. 1998 [Australia], Wilson et al. 1999 [New Zealand]
Sitobion sp. prope *rosaeiformis* (Das, 1918)	?	18		Dutta and Gautam 1993 [Shimla, Himachal Pradesh, India]
Sitobion sp.	?	12		Dutta and Gautam 1993 [Shimla, Himachal Pradesh, India]
Sorbaphis chaetosiphon Shaposhnikov, 1950	P(c)	38		Blackman 1986 [Japan]
Staticobium limonii (Contarini, 1847)	?	12		Blackman and Eastop 2006 [?]
Titanosiphon neoartemisiae (Takahashi, 1921)	P(c), P(o)	8		Blackman and Eastop 2006 [for specimens on *A. dracunculus* in Iran]
Tricaudatus polygoni (Narzikulov, 1953)	P(c)	8		Kar et al. 1990 [India]
Trichosiphonaphis (*Xenomyzus*) *polygoni* (van der Goot, 1917)	?	12		Chen and Zhang 1985a (as *Trichosiphonaphis ishimikawae* (Shinji 1941)) (cited after Blackman and Eastop 2015)
T. (*X.*) *polygonifoliae* (Shinji, 1944)	P(c)	12		Blackman and Eastop 2015 [?]
T. (*X.*) *tade* (Shinji, 1927)	?	10/9	XX/X0	Shinji 1927, 1931, 1941a (as *Carolinaia*), Blackman 1986 [Japan] (based on n(♂) = 5 (Shinji 1927, 1931))
		12		Blackman 1986 [Japan]
Tubaphis clematophila (Takahashi, 1965)	?	12		Blackman 1986 [Japan]
Tuberocephalus (*Trichosiphoniella*) *higansakurae* (Monzen, 1927)	P(c)	12		Blackman 1986 [Japan]
T. (*T.*) *liaoningensis* G. Zhang & Zhong, 1976	P(c)	12		Chen and Zhang 1985a [Beijing area, China] (cited after Blackman and Eastop 2015)
T. (*T.*) *misakurae* Moritsu & Hamasaki, 1983	P(c)	12		Blackman and Eastop 1994 [?]
T. (*T.*) *momonis* (Matsumura, 1917)	P(c)	12		Chen and Zhang 1985a [Beijing area, China] (cited after Blackman and Eastop 2015)
Uroleucon achilleae (Koch, 1855)	P(c)	12		Blackman 1980 [Great Britain]
U. ambrosiae (Thomas, 1878)	P(c), P(o)	12		Olive 1967 (as *Dactynotus*) [USA], Robinson and Chen 1969a (as *Dactynotus*) [Canada]

Taxon	Life cycle	2n ♀/♂	Genetic system, ♀/♂	References and collecting data
U. chondrillae (Nevsky, 1929)	P(c)	12		Blackman and Eastop 2006 [?]
U. chrysopsidicola (Olive, 1963)	P(c)	12		Olive 1967 (as *Dactynotus*) [USA]
U. cirsii (Linnaeus, 1758)	P(c)	10		Sun and Robinson 1966 , Robinson and Chen 1969a (as *Dactynotus*) [Canada], Kuznetsova and Gandrabur 1991 [St.Petersburg, Russia]
U. formosanum (Takahashi, 1921)	?	12	XX/X0	Shinji 1927, 1931 (as *Macrosiphum sonchi*), Blackman 1986 [Japan] (based on n(♂) = 6 (Shinji 1927, 1931))
U. fuscaudatum Chakrabarti & D.N. Raychaudhuri, 1978	?	12		Pal and Khuda-Bukhsh 1980, Khuda-Bukhsh and Pal 1986b [Rambara, Uttarakhand, India]
U. cichorii grossum (Hille Ris Lambers, 1939)	P(c)	12		Gut 1976 [Holland]
U. hypochoeridis (Fabricius, 1779)	P(c)	12		Gut 1976 [Holland]
U. jaceicola (Hille Ris Lambers, 1939)	P(c)	12		Gut 1976 [Holland]
U. longisetosum Chakrabarti & Verma, 1975	P(c)	10		Pal and Khuda-Bukhsh 1980, Khuda-Bukhsh and Pal 1986b [Gobindoghat, Uttarakhand, India]
U. macolai (Blanchard, 1932)	P(c)	12		Blackman and Eastop 2006 [?]
U. nigrotuberculatum (Olive, 1963)	P(c)	12		Olive 1967 (as *Dactynotus*) [USA]
U. paucosensoriatum (Hille Ris Lambers, 1960)	P(c)	12		Robinson and Chen 1969a (as *Dactynotus*) [Canada]
U. pseudambrosiae (Olive, 1963)	?	12		Olive 1967 (as *Dactynotus*) [USA]
U. pseudotanaceti (Verma, 1969 (1970))	P(c)	12		Kurl and Chauhan 1986a,1987a [Kangra, Himachal Pradesh, India]
U. reynoldense (Olive, 1965)	?	12		Olive 1967 (as *Dactynotus*) [USA]
U. rudbeckiae (Fitch, 1851)	P(c)	12		Olive 1967 (as *Dactynotus*) [USA]
U. russellae (Hille Ris Lambers, 1960)	P(c)	12		Olive 1967 (as *Dactynotus*) [USA]
U. simlaense Chakrabarti, A.K. Ghosh & D.N. Raychaudhuri, 1971	?	12		Kurl and Chauhan 1987a [Kandaghat, Himachal Pradesh, India]
U. sonchellum (Monell, 1879)	P(c)	12		Olive 1967 (as *Dactynotus*) [USA]
U. sonchi (Linnaeus, 1767)	P(c), ?P(o)	12	XX/X0	Olive 1967 (as *Dactynotus*) [USA]
		12		Kulkarni and Kacker 1981a [Dadhau, Himachal Pradesh, India], Kurl and Chauhan 1986c, 1987a [Barog, Himachal Pradesh, India], Kar et al. 1990 [India], Dutta and Gautam 1993 [Shimla, Himachal Pradesh, India]
U. tanaceti (Linnaeus, 1758)	P(c)	12		Gut 1976 [Holland]
U. tussilaginis (Walker, 1850)	P(c)	8?		Kuznetsova 1974 (as *Dactynotus basalis* Walker?) [?] (Blackman and Eastop 2015 supposed that the karyotype in Kuznetsova 1974 illustrated resembles that of *Acyrthosiphon pisum*)
U. (*Belochilum*) *inulae* (Ferrari, 1872)	?	12		Blackman and Eastop 2006 [?]
U. (*Lambersius*) *anomalae* (Hottes & Frison, 1931)	?	12		Olive 1967 (as *Dactynotus*) [USA]
U. (*L.*) *bradburyi* (Olive, 1965)	P(c)	12		Olive 1967 (as *Dactynotus*) [USA]
U. (*L.*) *erigeronense* (Thomas, 1878)	P(c)	12		Blackman and Eastop 2015 [?]
U. (*L.*) *gravicorne* (Patch, 1919)	P(c)	12		Olive 1967 (as *Dactynotus*) [USA]
U. (*L.*) *luteolum* (Williams, 1911)	P(c)	12		Olive 1967 (as *Dactynotus tissoti* Boudreaux, 1948 (1949)) [USA]
U. (*L.*) *penderum* Robinson, 1986	?	12		Blackman and Eastop 2006 [British Columbia, Canada]

Taxon	Life cycle	2n ♀/♂	Genetic system, ♀/♂	References and collecting data
U. (*L.*) *richardsi* Robinson, 1964	P(c)	12		Robinson and Chen 1969a (as *Dactynotus*) [Canada]
U. (*Uromelan*) *carthami* (Hille Ris Lambers, 1948)	?	12		Blackman and Eastop 2006 [?]
		14		Khuda-Bukhsh and Kar 1990 [Kalyani, West Bengal, India]
U. (*U.*) *compositae* (Theobald, 1915)	P(o)	12		Kurl and Misra 1983 (as *Dactinotus*) [Jodhpur, Rajasthan, India], Khuda-Bukhsh and Kar 1990 [Shillong, Meghalaya, India]
U. (*U.*) *gobonis* (Matsumura, 1917)	P(c), P(o)	12		Blackman and Eastop 1984, Chen and Zhang 1985a [Beijing area, China] (cited after Blackman and Eastop 2015)
		14	XX/X0	Shinji 1927, 1931, 1941a (as *Macrosiphum*), Blackman 1986 [Japan] (based on n(♂) = 7 (Shinji 1931))
U. (*U.*) *helianthicola* (Olive, 1963)	?	12		Olive 1967 (as *Dactynotus*) [USA]
U. (*U.*) *himachali* L.K. Ghosh, 1975	?	14		Kar et al. 1990 [India]
U. (*U.*) *illini* (Hottes & Frison, 1931)	P(c)	12		Blackman and Eastop 2006 [?]
U. (*U.*) *jaceae* (Linnaeus, 1758)	P(c)	12		Blackman 1980 [Great Britain], Kar et al. 1990 [India]
U. (*U.*) *rurale* (Hottes & Frison, 1931)	P(c)	10		Olive 1967 (as *Dactynotus*) [USA]
U. (*U.*) *taraxaci* (Kaltenbach, 1843)	P(c)	12		Sun and Robinson 1966 (as *Dactynotus*), Robinson and Chen 1969a (as *Dactynotus*) [Canada]
U. (*U.*) *tuataiae* Olive, 1963	?	12		Olive 1967 (as *Dactynotus*) [USA]
U. (*U.*) *verbesinae* (Boudreaux, 1949)	?	10		Olive 1967 (as *Dactynotus*) [USA]
Uroleucon sp. 1	?	12		Robinson and Chen 1969a (as *Dactynotus*) [Canada] (five different taxonomic forms)
Uroleucon sp. 2	?	12		Chen and Zhang 1985a [Beijing area, China] (cited after Blackman and Eastop 2015)
Utamphorophora crataegi (Monell, 1879)	P(c)	10		Robinson and Chen 1969a [Canada]
U. humboldti (Essig, 1941)	P(c), P(o)	20		Robinson and Chen 1969a (as *Myzodes physocarpi* Pepper, 1950) [Canada], Blackman 1980 [Great Britain]
Vesiculaphis caerulea Miyazaki, 1980	?	6		Blackman 1986 [Japan]
V. cephalata Miyazaki, 1971	P(c)	20		Blackman 1986 [Japan]
V. theobaldi Takahashi, 1930	P(c), P(o)	36		Blackman and Eastop 2006 [Great Britain, ?anholocyclic populations]
		38		Blackman and Eastop 2006 [Great Britain, ?anholocyclic populations]
		40		Gut 1976 [Holland]
Vesiculaphis sp.	?	24		Gautam and Kumar 2006 [Shimla, Himachal Pradesh, India]
Wahlgreniella nervata (Gillette, 1908)	?P(c), P(o)	12		Blackman 1980 [Great Britain]
W. vaccinii (Theobald, 1924)	P(c)	12		Blackman and Eastop 2015 [?]
Xerobion cinae (Nevsky, 1928)	P(c)	8		Blackman 1980 [Iran]

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References

Akimoto S (1985) Taxonomic study on gall aphids, *Colopha*, *Paracolopha* and *Kaltenbachiella* (Aphidoidea: Pemphigidae) in East Asia, with special reference to their origins and distributional patterns. Insecta matsumurana. Series entomology. New series 31: 1–79.

Baehr WB (1908) Über die Bildung der Sexualzellen bei Aphididae. Zoologischer Anzeiger (Leipzig) 33: 507–517.

Baehr WB (1909) Die Oogenese bei einigen viviparen Aphididen und die Spermatogenese von *Aphis saliceti*, mit besonderer Berücksichtigung der Chromatinverhältnisse. Archiv für Zellforschung (Leipzig) 3(1-2): 269–333.

Baehr WB von (1912) Contribution a l"etude de la caryocinese somatique, de la pseudoreduction et de la reduction (*Aphis saliceti*). La Cellule 27: 385–450.

Bakhtadze N, Kintsurashvili N, Bakhtadze G, Barjadze S, Zhukovskaya N, Chakvetadze N (2010) Karyological study of three species of the genus *Aphis* (Hemiptera: Aphididae) from Georgia. Bulletin of the Georgian National Academy of Sciences 4(2): 130–132.

Bašilova J, Turčinavičienė J, Rakauskas R (2008) Karyotypes of seven European aphid species of the genus *Cryptomyzus* (Hemiptera, Sternorrhyncha: Aphididae). Ekologija 54(4): 246–259. doi: 10.2478/v10055-008-0038-5

Behura BK, Bohidar K (1978) On the mitotic chromosomes of the lotus aphid *Rhopalosiphum nymphaeae*. Chromosome Information Service 25: 17–18. [cited after Blackman, Eastop 2015]

Bizzaro D, Barbolini E, Mandrioli M, Mazzoni E, Manicardi GC (1999) Cytogenetic characterization of the holocentric chromosomes in the aphids *Myzus varians* and *Myzus cerasi*. Caryologia 52(1-2): 81–85. doi: 10.1080/00087114.1998.10589157

Bizzaro D, Mandrioli M, Zanotti M, Giusti M, Manicardi GC (2000) Chromosome analysis and molecular characterization of highly repeated DNAs in the aphid *Acyrthosiphon pisum* (Aphididae, Hemiptera). Genetica 108: 197–202. doi: 10.1023/A:1004128314728

Blackman RL (1971) Chromosomal abnormalities in an anholocyclic biotype of *Myzus persicae* (Sulzer). Experientia 27(6): 704–706. doi: 10.1007/BF02136974

Blackman RL (1976) Cytogenetics of two species of *Euceraphis* (Homoptera, Aphididae). Chromosoma 56(4): 393–408. doi: 10.1007/BF00292958

Blackman RL (1977) The existence of two species of *Euceraphis* (Homoptera: Aphididae) on birch in western Europe, and a key to European and North American species of the genus. Systematic Entomology 2(1): 1–8. doi: 10.1111/j.1365-3113.1977.tb00349.x

Blackman RL (1980) Chromosome numbers in the Aphididae and their taxonomic significance. Systematic Entomology 5: 7–25. doi: 10.1111/j.1365-3113.1980.tb00393.x

Blackman RL (1985) Spermatogenesis in the aphid, *Amphorophora tuberculata* (Homoptera: Aphididae). Chromosoma (Berlin) 92: 357–362. doi: 10.1007/BF00327467

Blackman RL (1986) The chromosomes of Japanese Aphididae (Homoptera), with notes on the cytological work of Orihay Shinji. Cytologia 51: 59–83. doi: 10.1508/cytologia.51.59

Blackman RL (1987a) Differences in chromosome number between germ line and soma in the genus *Forda* (Homoptera: Aphididae). Genetica 74(2): 81–88. doi: 10.1007/BF00055217

Blackman RL (1987b) Morphological discrimination of a tobacco-feeding form from *Myzus persicae* (Sulzer) (Hemiptera: Aphididae), and a key to New World *Myzus* (*Nectarosiphon*) species. Bulletin of entomological research 77(4): 713–730. doi: 10.1017/S0007485300012219

Blackman RL (1988) Stability of a multiple X chromosome system and associated B chromosomes in birch aphids (*Euceraphis* spp.; Homoptera: Aphididae). Chromosoma (Berlin) 96(4): 318–324. doi: 10.1007/BF00286920

Blackman RL (1989) Cytological and morphological differences within Palaearctic *Glyphina* (Homoptera: Aphididae), and their taxonomic significance. Systematic Entomology 14: 7–13. doi: 10.1111/j.1365-3113.1989.tb00261.x

Blackman RL (1990) The chromosomes of Lachnidae. Acta phytopathologica and entomologica Hungarica 25: 273–282.

Blackman RL (2010) Aphids - Aphidinae (Macrosiphini). In: Wilson M (Ed.) Handbooks for identification of British insects, vol. 2, part 7. London, 414 pp.

Blackman RL (1995) Sex determination in insects. In: Leather SR, Hardie J (Eds) Insect reproduction. Boca Raton, 57–94.

Blackman RL, Brown PA (1991) Morphometric variation within and between populations of *Rhopalosiphum maidis* with a discussion of the taxonomic treatment of permanently parthenogenetic aphids (Homoptera: Aphididae). Entomologia Generalis 16(2): 97–113. doi: 10.1127/entom.gen/16/1991/097

Blackman RL, Brown PA, Eastop VF (1987) Problems in pest aphid taxonomy: can chromosomes plus morphometries provide some answers? In: Holman J, Pelikan J, Dixon AGF, Weismann L (Eds) Proceedings of International Symposia: Population Structure, Genetics and Taxonomy of Aphids and Thysanoptera, 9–14 September 1985, Smolenice, Czechoslovakia, 233–238.

Blackman RL, Brown PA, Ramırez CC, Niemeyer HM (2003) Karyotype variation in the South American aphid genus *Neuquenaphis* (Hemiptera, Aphididae, Neuquenaphidinae). Hereditas 138: 6–10. doi: 10.1034/j.1601-5223.2003.01692.x

Blackman RL, Cahill M (1998) The karyotype of *Bemisia tabaci* (Hemiptera: Aleyrodidae). Bulletin of Entomological Research 88: 213–215. doi: 10.1017/S0007485300025785

Blackman RL, De Boise E (2002) Morphometric correlates of karyotype and host plant in genus *Euceraphis* (Hemiptera: Aphididae). Systematic Entomology 27(3): 323–335. doi: 10.1046/j.1365-3113.2002.00181.x

Blackman RL, De Boise E, Czylok A (2001) Occurrence of sexual morphs in *Trama troglodytes* von Heyden, 1837 (Hemiptera, Aphididae). Journal of Natural History 35(5): 779–785. doi: 10.1080/00222930152023108

Blackman RL, Eastop VF (1984) Aphids on the world's crops: an identification and information guide. London, 466 pp.

Blackman RL, Eastop VF (1994) Aphids on world's trees: an identification and information guide. Wallingford, 987 pp.

Blackman RL, Eastop VF (2000) Aphids on the world's crops: an identification and information guide, 2nd edition. Chichester, 466 pp.

Blackman RL, Eastop VF (2006) Aphids on the world's herbaceous plants and shrubs. 2 volumes. London, 1439 pp.

Blackman RL, Eastop VF (2015) Electronic database: "Aphids on the world's plants". http://www.aphidsonworldsplants.info [18 March 2015]

Blackman RL, Eastop VF, Frazer BD, Raworth DA (1987) The strawberry aphid complex, *Chaetosiphon* (*Pentatrichopus*) spp. (Hemiptera: Aphididae): taxonomic significance of variations in karyotype chaetotaxy and morphology. Bulletin of Entomological Research 77(2): 201–212. doi: 10.1017/S0007485300011688

Blackman RL, Eastop VF, Hills M (1977) Morphological and cytological separation of *Amphorophora* Buckton (Homoptera: Aphididae) feeding on European raspberry and blackberry (*Rubus* spp.). Bulletin of Entomological Research 67(2): 285–296. doi: 10.1017/S000748530001110X

Blackman RL, Halbert SE, Carroll TW (1990) Association between karyotype and host plant in corn leaf aphid (Homoptera: Aphididae) in the northwestern United States. Environmental Entomology 19(3): 609–611. doi: 10.1093/ee/19.3.609

Blackman RL, Hales DF (1986) Behaviour of the X chromosomes during growth and maturation of parthenogenetic eggs of *Amphorophora tuberculata* (Homoptera, Aphididae) in relation to sex determination. Chromosoma 94(1): 59–64. doi: 10.1007/BF00293530

Blackman RL, Spence JM (1996) Ribosomal DNA is frequently concentrated on only one X chromosome in permanently apomictic aphids, but this does not inhibit male determination. Chromosome Research 4: 314–320. doi: 10.1007/BF02263684

Blackman RL, Spence JM, Normark BB (2000) High diversity of structurally heterozygous karyotypes and rDNA arrays in parthenogenetic aphids of the genus *Trama* (Aphididae: Lachninae). Heredity 84(2): 254–260. doi: 10.1046/j.1365-2540.2000.00667.x

Blackman RL, Takada H (1976) A naturally occurring chromosomal translocation in *Myzus persicae* (Sulzer). Journal of Entomology, Series A, Physiology, Behaviour 50(3): 147–156.

Blackman RL, Takada H (1977) The inheritance of natural chromosomal polymorphisms in the aphid *Myzus persicae* (Sulzer). Genetica 47(1): 9–15. doi: 10.1007/BF00122434

Blackman RL, Watson GW, Ready PD (1995) The identity of the African pine woolly aphid: a multidisciplinary approach. Bulletin OEPP 25(1-2): 337–341. doi: 10.1111/j.1365-2338.1995.tb01475.x

Börner CB (1952) Europae centralis Aphides. Mitteilungen der Thüringischen Botanischen Gesellschaft (Naumburg) 3(I-II): 1–484.

Boschetti MA (1963) L'ovogenesi partenogenetica in *Macrosiphoniella sanborni* Gill. (Homoptera Aphididae). Bolletino di Zoologia 30(1): 91–94. doi: 10.1080/11250006309442155

Boschetti MA, Pagliai AM (1964) L'azione della temperatura sull'ovogenesi partenogenetica di *Macrosiphum rosae* (Homoptera, Aphididae). Caryologia 17(1): 203–218. doi: 10.1080/00087114.1964.10796125

Brito RO, Affonso PRAM, Silva Jr. JC (2010) Chromosomal diversity and phylogenetic inferences concerning thrips (Insecta, Thysanoptera) in a semi-arid region of Brazil. Genetics and Molecular Research 9(4): 2230–2238. doi: 10.4238/vol9-4gmr843

Brown SW (1958) The chromosomes of an *Orthezia* species (Coccoidea-Homoptera). Cytologia 23: 429–434. doi: 10.1508/cytologia.23.429

Brown SW (1960) Spontaneous chromosome fragmentation in the armored scale insects (Coccoidea-Diaspididae). Journal of Morphology 106(2): 159–185. doi: 10.1002/jmor.1051060204

Brown SW (1965) Chromosomal survey of the armored and palm scale insects (Coccoidea: Diaspididae and Phoenicococcidae). Hilgardia 36: 189–294.

Brown SW (1967) Chromosome systems of the Eriococcidae (Coccoidea-Homoptera). 1. A survey of several genera. Chromosoma (Berlin) 22: 126–150. doi: 10.1007/BF00326725

Brown SW (1977) Adaptive status and genetic regulation in major evolutionary changes of coccid chromosome systems. Nucleus (Calcutta) 20: 145–157.

Brown PA, Blackman RL (1988) Karyotype variation in the corn leaf aphid, *Rhopalosiphum maidis* (Fitch), species complex (Hemiptera: Aphididae) in relation to host-plant and morphology. Bulletin of Entomological Research 78(2): 351–363. doi: 10.1017/S0007485300013110

Brown SW, Chandra HS (1977) Chromosome imprinting and the differential regulation of homologous chromosomes. In: Goldstein L, Prescott DM (Eds) Cell Biology. Vol. 1. Genetic mechanisms of cells. New York, 109–189.

Brown SW, Cleveland C (1968) Meiosis in the male of *Puto albicans* (Coccoidea-Homoptera). Chromosoma (Berlin) 24: 210–232. doi: 10.1007/BF00285204

Bulman SR, Stufkens MAW, Eastop VF, Teulon DAJ (2004) *Rhopalosiphum* aphids in New Zealand. II. DNA sequences reveal two incompletely described species New Zealand. Journal of Zoology 32(1): 37–45. doi: 10.1080/03014223.2005.9518396

Chattopadhyay D, Das PL, Raychaudhuri D (1982) Karyotype variation of *Rhopalosiphum maidis* (Fitch) (Homoptera: Aphididae). Entomon 7(4): 441–446.

Chattopadhyay D, Raychaudhuri DN (1980) Chromosomal studies on aphids (Homoptera: Aphididae). Science and Culture 46(9): 326–328.

Chauhan RS, Kurl SP (1990) Karyology of *Amphicercidus tuberculatus* (Homoptera: Aphididae) from Kashmir valley. Journal of Aphidology 4(1-2): 79–81.

Chen XS, Zhang GX (1985a) The karyotypes of 51 species of Aphids (Homoptera, Aphidoidea) in Beijing Area. Acta Zoologica Sinica 31(1): 12–19. [cited after Blackman, Eastop 2015]

Chen XS, Zhang GX (1985b) The karyotype of aphids and its taxonomic significance. Journal of the Graduate School, Academia Sinica 2: 189–200. [cited after Blackman, Eastop 2015]

Chen XS, Zhang GX (1985c) Comparison and analysis on the chromosome C-banding patterns of *Lipaphis erysimi* Kaltenbach and *Aphis craccivora* Koch. Acta Entomologica Sinica 28(3): 271–273.

Cognetti G (1961a) Endomeiosis in parthenogenetic lines of Aphids. Experientia 17(4): 168–169. doi: 10.1007/BF02160362

Cognetti G (1961b) Citogenetica della partenogenesi negli Afidi. Archivio Zoologico Italiano 46: 89–122.

Cognetti G, Cognetti-Varriale AM (1961) Ricerche cariologiche su *Macrosiphum rosae*, *Myzodes persicae* e *Brevicoryne brassicae* [Homoptera Aphididae]. Atti della Accademia nazionale dei Lincei. Rendiconti. Classe di scienze fisiche, matematiche e naturali, ser. VIII, 30, 1–4.

Colling AW (1955) Aphid chromosomes. Nature 176(4474): 207–208. doi: 10.1038/176207b0

Cook LG (2000) Extraordinary and extensive karyotypic variation: a 48-fold range in chromosome number in the gall-inducing scale insect Apiomorpha (Hemiptera: Eriococcidae). Genome 43: 255–263. doi: 10.1139/gen-43-2-255

Cook LG (2001) Extensive chromosomal variation associated with taxon divergence and host specificity in the gall-inducing scale insect *Apiomorpha munita* (Schrader) (Hemiptera: Sternorrhyncha: Coccoidea: Eriococcidae). Biological Journal of Linnean Society 72: 265–278. doi: 10.1111/j.1095-8312.2001.tb01316.x

Criniti A, Simonazzi G, Cassanelli S, Ferrari M, Bizzaro D, Manicardi GC (2005) X-linked heterochromatin distribution in the holocentric chromosomes of the green apple aphid *Aphis pomi*. Genetica (Dordrecht) 124(1): 93–98. doi: 10.1007/s10709-004-8154-y

Criniti A, Simonazzi G, Cassanelli S, Ferrari M, Bizzaro D, Manicardi GC (2009) Distribution of heterochromatin and rDNA on the holocentric chromosomes of the aphids *Dysaphis plantaginea* and *Melanaphis pyraria* (Hemiptera: Aphididae). European Journal of Entomology 106(2): 153–157. doi: 10.14411/eje.2009.018

Czylok A, Blackman RL (1991) A new species of *Stomaphis* Walker (Homoptera: Aphididae) from Czechoslovakia. Journal of Natural History 25(3): 665–669. doi: 10.1080/00222939100770431

Danzig EM (1986) Coccids of the Far-Eastern USSR (Homoptera: Coccinea). Phylogenetic analysis of coccids in the world fauna. New Delhi, 450 pp.

Danzig EM, Gavrilov-Zimin IA (2014) Palaearctic mealybugs (Homoptera: Coccinea: Pseudococcidae). Part 1. Subfamily Phenacoccinae. St. Petersburg, 678 pp. (Fauna of Russia and neighbouring countries. New series, № 148. Insecta: Hemiptera: Arthroidignatha).

Das PL, Chattopadhyay D, Raychaudhuri D (1985) Comparative karyological studies of two cinarine aphids (Homoptera: Aphididae) from Kashmir valley. Entomon 10(4): 317–322. [cited after Blackman, Eastop 2015]

Datta S, Khuda-Bukhsh AR (1980) Chromosomal study in the viviparous alatoid females of *Tinocallis kahawaluokalani* (Kirkaldy) (Homoptera: Aphididae). Current Science (Bangalore) 49(10): 411–412.

De Barro PJ (1992) Karyotypes of cereal aphids in south Australia with special reference to *Rhopalosiphum maidis* (Fitch) (Hemiptera: Aphididae). Journal of the Australian Entomological Society 31(4): 333–334. doi: 10.1111/j.1440-6055.1992.tb00518.x

Dhatwalia N, Gautam DC (2009) Cytogenetic studies on willow aphids. Cytologia 74(2): 125–131. doi: 10.1508/cytologia.74.125

Dionne LA, Spicer PB (1957) A squash method for somatic chromosomes of aphids. Canadian Journal of Zoology, 35(6): 711–713. doi: 10.1139/z57-060

Dutta J, Gautam DC (1993) Chromosomes of aphid fauna from North-western Himalayas, India. Cytologia 58(4): 367–375. doi: 10.1508/cytologia.58.367

Dutta S, Khuda-Bukhsh AR (1980) Chromosomal study in the viviparous alatoid females of *Tinocallis kahawaluokalani* (Kirkaldy) (Homoptera, Aphididae). Current Science 49(10): 411–412.

Emeljanov AF, Kirillova VI (1989) Trends and modes of karyotype evolution in Cicadina (Homoptera). I. Peculiarities and evolutionary changes of the karyotypes in the superfamily Cicadelloidea. Entomologicheskoe Obozrenie 68: 587–603. [In Russian]

Emeljanov AF, Kirillova VI (1991) Trends and modes of karyotype evolution in Cicadina (Homoptera). II. Peculiarities and evolutionary changes of the karyotypes in the superfamilies Cercopoidea, Cicadoidea, Fulgoroidea and in Cicadina as a whole. Entomologicheskoe Obozrenie 70: 796–817. [In Russian]

Feng H-t, You B-y (1988) Host-plant related chromosome polymorphism in the turnip aphid, *Lipaphis erysimi*. Plant Protection Bulletin (Taichung) 30(2): 135–147.

Forneck A, Jin Y, Walker A, Blaich R (1999) Karyotype studies on grape phylloxera (*Daktulosphaira vitifoliae* Fitch). Vitis 38(3): 123–125.

Fox JW (1957) Chromosome number in *Rhopalosiphum prunifoliae* (Fitch) and *Rhopalosiphum pseudobrassicae* (Davis) (Hemiptera: Aphididae). Transactions of the American Microscopical Society 76(2): 208–211. doi: 10.2307/3223635

Frolowa S (1924) Die El- und Samenreifung bei *Chermes strobilobius* und *Chermes pectinatae*. Zeitschrift für Zellforschung und Mikroskopische Anatomie 1: 29–56. doi: 10.1007/BF02583460

Galli E, Manicardi GC (1998) Cytogenetic analysis on the gall generation of two aphid species: *Tetraneura nigriabdominalis* and *Tetraneura ulmi*. Caryologia 51(3-4): 235–243. doi: 10.1080/00087114.1998.10797415

Gautam DC, Bizzaro D, Manicardi GC (1993) Karyotype analysis and DNA content in two species of root aphids, Caryologia. International Journal of Cytology, Cytosystematics and Cytogenetics 46(2-3): 209–217.

Gautam DC, Dhatwalia N (2003) Karyotypes of twenty one species of aphids from Northwestern Himalayas. The Journal of Cytology and Genetics 4(NS): 1–9.

Gautam DC, Dutta J (1994) Karyotype variation in the aphid *Sitobion rosaeiformis* (Das) (Homoptera: Aphididae). Cytologia 59(1): 1–5. doi: 10.1508/cytologia.59.1

Gautam DC, Kapoor L (2002) Chromosomes of *Macrosiphini* Aphids. Nucleus 45(3): 134–138.

Gautam DC, Kumar A (2006) Karyotypic studies on aphids of *Quercus* and *Rhododendron*. Perspectives in Cytology and Genetics 12: 211–216.

Gautam DC, Kumari M (2003) Karyotype of *Aphis pomi* De Geer – first report from India. Journal of Cytology and Genetics 4 (NS): 95–96.

Gautam DC, Sharma RK (1990) Chromosome numbers and idiograms of seven species of aphids from Northwestern Himalayas. Chromosome Information Service 49: 16–18.

Gautam DC, Verma LR (1982) Karyotype analysis and mitotic cycle of woolly apple aphid *Eriosoma lanigerum* (Hausmann). Entomon 7: 167–171.

Gautam DC, Verma LR (1983) Chromosome numbers in different morphs of woolly apple aphid *Eriosoma lanigerum* (Hausmann). Chromosome Information Service 35: 9–10.

Gavrilov IA (2007) A catalogue of chromosome numbers and genetic systems of scale insects (Homoptera: Coccinea) of the world. Israel Journal of Entomology 37: 1–45.

Gavrilov IA, Trapeznikova IV (2007) Karyotypes and reproductive biology of some mealybugs (Homoptera: Coccinea: Pseudococcidae). Comparative Cytogenetics 1(2): 139–148.

Gavrilov IA, Trapeznikova IV (2008) Cytogenetic studies of European Pulvinariini (Homoptera: Coccinea). Comparative Cytogenetics 2(2): 123–131.

Gavrilov IA, Trapeznikova IV (2010) Karyotypes of six previously unstudied European mealybugs (Homoptera : Pseudococcidae). Comparative Cytogenetics 4(2): 203–205. doi: 10.3897/compcytogen.v4i2.44

Gavrilov-Zimin IA (2011) New cytogenetic data for some Palaearctic species of scale insects (Homoptera: Coccinea) with karyosystematic notes. Comparative Cytogenetics 5(5): 375–390. doi: 10.3897/compcytogen.v5i5.2116

Gavrilov-Zimin IA (2012) A contribution to the taxonomy, cytogenetics and reproductive biology of the genus *Aclerda* Signoret (Homoptera, Coccinea, Aclerdidae). Comparative Cytogenetics 6(4): 389–395. doi: 10.3897/compcytogen.v6i4.4320

Gavrilov-Zimin IA, Danzig EM (2012) Taxonomic position of the genus *Puto* Signoret (Homoptera: Coccinea: Pseudococcidae) and separation of higher taxa in Coccinea. Zoosystematica Rossica 22(1): 97–111.

Giannini S, Bizzaro D, Mandrioli M, Manicardi GC (2003) Cytogenetic analysis on the holocentric chromosomes of the cabbage aphid *Brevicoryne brassicae*. Caryologia 56(2): 143–147. doi: 10.1080/00087114.2003.10589317

Golub NV, Nokkala S (2004) Chromosome numbers of two sucking louse species (Insecta, Phthiraptera, Anoplura). Hereditas 141: 94–96. doi: 10.1111/j.1601-5223.2004.01859.x

Golub NV, Nokkala S (2009) Chromosome numbers in eight species of Palaearctic Psocoptera (Insecta). Comparative Cytogenetics 3(1): 33–41. doi: 10.3897/compcytogen.v3i1.6

Gullan PG, Cook LG (2007) Phylogeny and higher classification of the scale insects (Hemiptera: Sternorrhyncha: Coccoidea). Zootaxa 1668: 413–425.

Gut J (1976) Chromosome numbers of parthenogenetic females of fifty-five species of Aphididae (Homoptera) new to cytology. Genetica 46(3): 279–285. doi: 10.1007/BF00055471

Hales DF (1989) The chromosomes of *Schoutedenia lutea* (Homoptera, Aphidoidea, Greenidinae) with an account of meiosis in the male. Chromosoma 98: 295–300. doi: 10.1007/BF00327316

Hales DF (1993) The Myzus persicae group in Australia: how many species? In: Kindlmann P, Dixon AFG (Eds) Critical Issues in Aphid Biology: proceedings of the 4th International Symposium on Aphids. České Budějovice August - September 1993, University of South Bohemia, 75–77.

Hales DF, Chapman RL, Lardner RM, Cowen R, Turak E (1990) Aphids of the genus *Sitobion* occurring on grasses in southern Australia. Journal of the Australian Entomological Society 29(1): 19–25. doi: 10.1111/j.1440-6055.1990.tb00308.x

Hales DF, Cowen R (1990) Genetic studies of *Rhopalosiphum* in Australia. Acta Phytopathologica et Entomologica Hungarica 25(1-4): 283–288.

Hales DF, Foottit RG, Maw E (2010) Morphometric studies of the genus *Sitobion* Mordvilko 1914 in Australia (Hemiptera: Aphididae). Australian Journal of Entomology 49(4): 341–353. doi: 10.1111/j.1440-6055.2010.00770.x

Hales DF, Lardner RM (1988) Genetic evidence for the occurrence of a new species of *Neophyllaphis* Takahashi (Homoptera: Aphididae) in Australia. Journal of the Australian Entomological Society 27(2): 81–85. doi: 10.1111/j.1440-6055.1988.tb01150.x

Hales DF, Mittler TE (1983) Precocene causes male determination in the aphid *Myzus persicae*. Journal of Insect Physiology 29(11): 819–823. doi: 10.1016/0022-1910(83)90147-6

Hales DF, Mittler TE (1987) Chromosomal sex determination in aphids controlled by juvenile hormone. Genome 29(1): 107–109. doi: 10.1139/g87-018

Hales DF, Sunnucks P, Wilson ACC (1998) *Sitobion* in the South Seas - microsatellite revelations. In: Nieto Nafria JM, Dixon AFG (Eds) Aphids in natural and managed ecosystems. Proceedings of the Fifth International Symposium on Aphids, Leon, Spain, 15–19 September, 1997: 69–75.

Hales DF, Wilson ACC, Spence JM, Blackman RL (2000) Confirmation that *Myzus antirrhinii* (Macchiati) (Hemiptera: Aphididae) occurs in Australia, using morphometrics, microsatellite typing and analysis of novel karyotypes by fluorescence *in situ* hybridization. Australian Journal of Entomology 39(3): 123–129. doi: 10.1046/j.1440-6055.2000.00160.x

Harlow CD, Southern PS, Lampert EP (1991) Geographic distribution of two color forms, carboxylesterase activity, and chromosome configurations of the tobacco aphid (Homoptera: Aphididae) in North Carolina. Journal of Economic Entomology 84(4): 1175–1179. doi: 10.1093/jee/84.4.1175

Harper AM, MacDonald MD (1966) Chromosomes of gall aphids in the subfamily Eriosomatinae (Homoptera: Aphididae). Canadian Journal of Genetics and Cytology 8(4): 788–791. doi: 10.1139/g66-094

Harper AM, MacDonald MD (1968) Comparisons of lengths and areas in karyotype analysis of Aphididae. Canadian Journal of Genetics and Cytology 10(2): 221–227. doi: 10.1139/g68-032

Heie O (1987) Palaeontology and phylogeny. In: Minks AK, Harrewijn P (Eds) Aphids, their biology, natural enemies and control. Amsterdam, 367–391.

Heie OE, Wegierek P (2009a) A classification of the Aphidomorpha (Hemiptera Sternorrhyncha) under consideration of the fossil taxa. Redia 92: 69–77.

Heie OE, Wegierek P (2009b) Diagnoses of the higher taxa of Aphidomorpha (Hemiptera Sternorrhyncha). Redia 92: 261–269.

Hewitt CG (1906) The Cytological aspect of parthenogenesis in insects. Memoirs and Proceedings of the Manchester Literary, Philosophical Society 1905–1906, 50: 1–38.

Hodgson Ch (2014) *Phenacoleachia*, *Steingelia*, *Pityococcus* and *Puto* – neococcoids or archaeococcoids? An intuitive phylogenetic discussion based on adult male characters. Acta Zoologica Bulgarica. Suppl. 6: 41–50.

Honda H (1921) Spermatogenesis of Aphids; the fate of the smaller secondary spermatocyte. The Biological Bulletin 40(6): 349–369. doi: 10.2307/1536499

Hughes-Schrader S (1925) Cytology of hermaphroditism in *Icerya purchasi* (Coccidae). Zeitschrift für Zellforschung und Mikroskopische Anatomie 2: 264–292. doi: 10.1007/BF00376393

Hughes-Schrader S (1930) Contributions to the life history of the Iceryine coccids, with special reference to parthenogenesis and hermaphroditism. Annals of the entomological society of America 23(2): 359–380. doi: 10.1093/aesa/23.2.359

Hughes-Schrader S (1931) A study of the chromosome cycle and the meiotic division-figure in *Llaveia bouvari* - a primitive coccid. Zeitschrift für Zellforschung und Mikroskopische Anatomie 13: 742–769. doi: 10.1007/BF02450250

Hughes-Schrader S (1942) The chromosomes of *Nautococcus schraderae* Vays. and the meiotic division figures of male Llaveine coccids. Journal of Morphology 70: 261–99. doi: 10.1002/jmor.1050700207

Hughes-Schrader S (1944) A primitive coccid chromosome cycle in *Puto* sp. Biological Bulletin 87: 167–176. doi: 10.2307/1537954

Hughes-Schrader S (1948) Cytology of coccids (Coccoidea-Homoptera). Advances in Genetics 2: 127–203.

Hughes-Schrader S (1955) The chromosomes of the giant scale, *Aspidoproctus maximus* Louns. (Coccoidea-Margarodidae) with special reference to asynapsis and sperm formation. Chromosoma (Berlin) 7: 420–438. doi: 10.1007/BF00329735

Hughes-Schrader S (1963) Hermaphroditism in an African coccid, with notes on other Margarodids (Coccoidea-Homoptera). Journal of Morphology 113: 173–184. doi: 10.1002/jmor.1051130205

Jangra S, Tripathi NK, Poonam (2014) Chromosomal studies on two species of aphids from Jammu (J&K), India. International Journal of Recent Scientific Research Research 5(7): 1338–1341.

Jauset AM, Muñoz MP, Pons X (2000) Karyotype occurrence and host plants of the corn leaf aphid (Homoptera: Aphididae) in a Mediterranean region. Annals of the Entomological Society of America 93(5): 1116–1122. doi: 10.1603/0013-8746(2000)093[1116:KOAHPO]2.0.CO;2

Kapoor L, Gautam DC (1994) Karyotype studies on aphids from Himachal Pradesh (Northwestern Himalayas), India. Cytologia 59(2): 159–164. doi: 10.1508/cytologia.59.159

Kar I, Khuda-Bukhsh AR (1986) Somatic chromosomes of two species of orange aphids from the north-eastern Himalayas, India. Newsletter the Aphidological Society, India 5(2): 9–11.

Kar I, Khuda-Bukhsh AR (1989) Karyotypic studies on twelve species of aphids (Homoptera: Aphididae) from the North-Eastern Himalayas. Journal of Aphidology 3(1-2): 42–53.

Kar I, Basu G, Khuda Bukhsh AR (1990) A check-list of chromosomes of aphids Homoptera: Aphididae worked out in India along with the names and families of their host plants. Environment and Ecology 8(1B): 414–428.

Kar I, Khuda-Bukhsh AR (1991a) Intra-specific karyotypic variations in two species of polyphagous aphids (Homoptera Aphididae). Entomon 16(2): 139–146.

Kar I, Khuda-Bukhsh AR (1991b) Nucleolar organizer regions (NORs) in the chromosomes of an aphid *Lipaphis erysimi* Kalt (Homoptera: Aphididae) with variable chromosome numbers. Cytologia 56(1): 83–86. doi: 10.1508/cytologia.56.83

Khuda-Bukhsh AR (1980) Karyotypic studies in six species of aphids from Garhwal Himalayas. Entomon 5(4): 247–250.

Khuda-Bukhsh AR (1982) Chromosomes of three species of *Aphis* (Homoptera : Aphididae) from Garhwal Himalayas. Chromosome Information Service 33: 9–10.

Khuda-Bukhsh AR, Basu G (1987) Karyotypic studies on five species of aphids (Homoptera: Aphididae) from the North-Eastern Himalayas. Entomon 12: 273–277. [cited after Blackman, Eastop 2015]

Khuda-Bukhsh AR, Datta S (1981a) A preliminary note on the mitotic chromosome aberrations in embryos of whole-body X-irradiated parthenogenetic viviparous *Aphis gossypii* (Homoptera, Aphididae). Chromosome Information Service 30: 4–5.

Khuda-Bukhsh AR, Datta S (1981b) Somatic chromosomes of four species of aphids (Aphididae: Homoptera). In: Manna GK, Umakant Sinha (Eds) Perspectives in cytology and genetic, vol. 3: Proceedings of the third all India congress of cytology and genetics, held at the Haryana Agricultural University, Hissar, October 23–27, 1978, New Delhi, 121–124.

Khuda-Bukhsh AR, Kar I (1987) Karyological studies in five species of Hormaphidinae aphids (Homoptera : Aphididae). Entomon 12(3): 267–271.

Khuda-Bukhsh AR, Kar I (1989a) Karyotypic studies in five species of *Macrosiphum* (Homoptera: Aphididae). In: Manna GK, Umakant Sinha (Eds) Perspectives in cytology and genetic, vol. 6: Proceedings of the six all India congress of cytology and genetics, University of Jammu, Jammu, Kashmir, October 12–17, 1987, New Delhi, 449–453. [cited after Blackman, Eastop 2015]

Khuda-Bukhsh AR, Kar I (1989b) C-banded karyotype of a common polyphagous aphid, *Aphis gossypii* (Homoptera: Aphididae): indication of structural rearrangements. Entomon 14(1-2): 11–14.

Khuda-Bukhsh AR, Kar I (1990) Karyotypic studies in twenty-seven species of aphids (Homoptera: Aphididae) from India. Cytologia 55: 231–241. doi: 10.1508/cytologia.55.231 [cited after Blackman, Eastop 2015]

Khuda-Bukhsh AR, Pal NB (1983a) Karyology of four species of gall-forming aphids (Homoptera: Aphididae) from Garhal Himalayas. Entomon 8(2): 109–114.

Khuda-Bukhsh AR, Pal NB (1983b) Chromosomes in three species of aphids from Garhwal Himalayas. Environment, Ecology 1: 125–127.

Khuda-Bukhsh AR, Pal NB (1984a) Karyomorphology of Five Species of Aphids. Environment, Ecology 2(4): 329–332.

Khuda-Bukhsh AR, Pal NB (1984b) A further cytological investigation on *Lipaphis erysimi* (Homoptera: Aphididae): chromosomal variations. In: Manna GK, Sinha (Eds) Perspectives in cytology and genetics 4: 403–409.

Khuda-Bukhsh AR, Pal NB (1985) Cytogenetical studies on aphids (Homoptera: Aphididae) from India: I. Karyomorphology of eight species of *Aphis*. Entomon 10(2): 171–177.

Khuda-Bukhsh AR, Pal NB (1986a) Cytogenetical studies on aphids (Homoptera: Aphididae) from India II. Karyomorphology of five species of *Myzus*. Entomon 11: 135–140.

Khuda-Bukhsh AR, Pal NB (1986b) Cytogenetical studies on aphids (Homoptera: Aphididae) from India III. Karyology of fifteen species belonging to the tribe Macrosiphini. Entomon 11: 141–147.

Kluge NJ (2010) Paradoxical molting process in *Orthezia urticae* and other coccids (Arthroidignatha: Gallinsecta) with notes on systematic position of scale insects. Zoosystematica Rossica 19(2): 246–271.

Koteja J (1990) Paleontology. In: Rosen D (Ed.) World Crop Pests. Armored scale insects. Their biology, natural enemies and control. Vol. 4A, 149–163.

Kulkarni PP (1984) Chromosomes of seven species of aphids (Homoptera: Aphididae). Bulletin of the Zoological Survey of India 6: 267–270.

Kulkarni PP, Kacker RK (1979) Chromosomes of four species of aphids Homoptera: Aphididae. Bulletin of the Zoological Survey of India 2(1): 1–2

Kulkarni PP, Kacker RK (1980) Chromosomes of five species of aphids (Homoptera: Aphididae). Bulletin of the Zoological Survey of India 3(1-2): 103–105.

Kulkarni PP, Kacker RK (1981a) Chromosomes of six species of aphids (Homoptera: Aphididae). Bulletin of the Zoological Survey of India 3(3): 249–251.

Kulkarni PP, Kacker RK (1981b) A simple technique for preparation of somatic chromosomes of aphids. Bulletin of the Zoological Survey of India 3(3): 277–278.

Kurl SP (1978) Chromosome numbers of ten species of Indian aphids. Chromosome Information service 25: 17–18.

Kurl SP (1980a) Cytotaxonomy of the genus *Toxoptera* (Homoptera: Aphididae). Entomon 5(4): 251–256.

Kurl SP (1980b) Chromosome numbers of four species of Indian aphids (Homoptera: Aphididae). National Academy Science Letters, India 3(6): 185–186.

Kurl SP (1981) Karyotypic study in *Tinocalloides montanus* A.N. Basu (Homoptera: Aphididae). Current Science 50(5): 241–242.

Kurl SP (1986) Variation in chromosome numbers and structural heterozygosity in ten species of aphids Homoptera: Aphididae from Meghalaya. In: Kurl SP (Ed.) Proceedings of the second national symposium on recent trends in aphidological studies, September 26–29, 1985: 327–331.

Kurl SP, Chauhan RS (1986a) Chromosome number in eleven species of aphids (Homoptera: Aphididae) hitherto unknown to cytology. In: Kurl SP (Ed.) Proceedings of the Second National Symposium on Recent Trends in Aphidological Studies, September 26–29, 1985: 183–189.

Kurl SP, Chauhan RS (1986b) Similarities in chromosome number in four species of *Aphis* (Homoptera: Aphididae). In: Kurl SP (Ed.) Proceedings of the Second National Symposium on Recent Trends in Aphidological Studies, September 26–29, 1985: 221–227.

Kurl SP, Chauhan RS (1986c) New records of chromosomes in four species of aphids. Newsletter the Aphidological Society, India, 5(1): 7–9.

Kurl SP, Chauhan RS (1986d) Karyology of four species of aphids from Himachal Pradesh. Newsletter the Aphidological Society, India 5(2): 19–20.

Kurl SP, Chauhan RS (1987a) Chromosome numbers of Indian Aphids: their possible evolution and taxonomic significance. Journal of Aphidology 1(1-2): 70–77.

Kurl SP, Chauhan RS (1987b) Karyomorphology of four species of aphids (Homoptera: Aphididae) from Himachal Pradesh. Journal of Aphidology 1(1-2): 105–111.

Kurl SP, Misra SD (1979) Chromosome number and karyotype of corn-leaf aphid, *Rhopalosiphum maidis* Fitch. Chromosome information service 27: 18–20.

Kurl SP, Misra SD (1980) Chromosomal study of *Brachyunguis calotropicus* (Homoptera: Aphididae). Akitu (new series) 29: 1–2.

Kurl SP, Misra SD (1981) Studies on the mitotic chromosomes of two species of aphids (Homoptera: Aphididae). In: Manna GK, Umakant Sinha (Eds) Perspectives in cytology and

genetic, vol. 3: proceedings of the third all India congress of cytology and genetics, held at the Haryana Agricultural University, Hissar, October 23–27, 1978, New Delhi, 125–130.

Kurl SP, Misra SD (1983) Karyological studies in two species of aphids. Pranikee 4: 194–201.

Kuznetsova VG (1968) Aphid karyotypes of the subtribe Anuraphidina (Aphididae) and the possible paths of their evolution. Entomologicheskoe Obozrenie 47(4): 767–781. [In Russian]

Kuznetsova VG (1969) On the chromosome number in *Myzodes persicae* Sulz. Tsitologiya 11(3): 386–388. [In Russian]

Kuznetsova VG (1974) The characteristics of the chromosomes of Aphidoidea. Tsitologiya 16(7): 803–809. [In Russian]

Kuznetsova VG (1975) Investigation of close species of aphids with different karyotypes by the DNA cytophotometry method. Doklady Akademii Nauk SSSR, Seriya Biologiya 224(2): 457–459. [In Russian]

Kuznetsova VG (1978) The disturbance of anaphase chromosome disjunction in the cleavage of *Cavariella* sp. (Homoptera, Aphidinea). Tsitologiya 20(6): 705–707. [In Russian]

Kuznetsova VG, Daniyarova MM (1980) Karyotypes of aphids species of genus *Dysaphis* Börn (Homopt., Aphididae, Anuraphidina) from Tajikistan. Doklady Akademii Nauk Tadzjikskoy SSR 23(12): 734–736. [In Russian]

Kuznetsova VG, Gandrabur SI (1991) The nucleolar organizing regions in the aphid chromosomes. Tsitologia 33(2): 41–47. [In Russian]

Kuznetsova VG, Grozeva SM, Nokkala S, Nokkala Ch (2011) Cytogenetics of the true bug infraorder Cimicomorpha (Hemiptera, Heteroptera). Zookeys 154: 31–70. doi: 10.3897/zookeys.154.1953

Kuznetsova VG, Lukhtanov VA, Kirillova VI, Koroleva Yu (1988) Karyotypes of insects – pests of agricultural plants. Cytology and genetics 22(4): 56–59. [In Russian]

Kuznetzova VG, Sapunov VB (1985) Effect of X-irradiation on the morphological and karyotypic variability in aphid *Aphis craccivora* Koch. Tsitologiya i Genetika 19(5): 387–390. [In Russian]

Kuznetzova VG, Sapunov VB (1987) Effect of X-rays on the morphological and karyological inconstancy of aphids. In: Holman J, Pelikán J, Dixon AFG, Weismann L (Eds) Population structure, genetics and taxonomy of aphids and Thysanoptera. Proceedings of International Symposia, held at Smolenice, Czechoslovakia, September 9–14, 1985, 134–138.

Kuznetsova VG, Shaposhnikov GCh (1973) Chromosome numbers of aphids (Homoptera, Aphidinea) of the world fauna. Entomologicheskoe Obozrenie 52(1): 116–135. [In Russian]

Lawson CA (1936) A chromosome study of the aphid *Macrosiphum solanifolii*. Biological Bulletin 70 (2): 288–307. doi: 10.2307/1537474

MacDonald MD, Harper AM (1965) A rapid Feulgen squash method for aphid chromosomes. Canadian Journal of Genetics and Cytology 7(1): 18–20. doi: 10.1139/g65-003

Maillet P (1957) Sur les chromosomes de quelques Phylloxerides de France. Vitis 1: 153–155.

Mamontova VA (1991) Remarks on the paper by Yu.M. Rukavishnikov "An attempt of an analysis by karyological method of superspecific taxa in Lachnidae family'. Vestnik Zoologii 4: 83–85.

Mamontova VA (2001) Phylogenesis and system of the aphids of the family Lachnidae Aphidoidea, Homoptera with taking into account the data concerning caryotypes. Vestnik Zoologii 35(4): 316.

Mandrioli M, Ganassi S, Bizzaro D, Manicardi GC (1999) Cytogenetic analysis of the holocentric chromosomes of the aphid *Schizuphis graminum*. Hereditus 131(3): 185–190. doi: 10.1111/j.1601-5223.1999.t01-1-00185.x

Manicardi GC, Bizzaro D, Bonvicini Pagliai AM, Bianchi U (1991) Characterization of *Acyrthosiphon pisum* Harris (Homoptera: Aphididae) karyotype using G and C banding. Atti del Congresso Nazionale Italiano di Entomologia 16: 513–517.

Manicardi GC, Gautam DC (1994) Cytogenetic investigations on holocentric chromosomes of *Tetraneurella akinire* (Sasaki) (Homoptera, Pemphigidae). Caryologia 47(2): 159–165. doi: 10.1080/00087114.1994.10797293

Manicardi GC, Gautam DC, Bizzaro D, Guicciardi E, Bonvicini Pagliai AM, Bianchi U (1991) Chromosome banding in aphids: G, C, and AluI, and HaeIII banding patterns in *Megoura viciae* (Homoptera, Aphididae). Genome 34(4): 661–665. doi: 10.1139/g91-101

Manicardi GC, Mandrioli M, Bizzaro D, Bianchi U (1998) Silver staining as a new banding technique to identify aphid chromosomes. Chromosome Research 6: 55–57. doi: 10.1023/A:1009270525511

Manicardi GC, Mandrioli M, Blackman RL (2015[2014]) The cytogenetic architecture of the aphid genome. Biological Reviews 90: 112–125. doi: 10.1111/brv.12096

Martin JH (1981) A new species of *Acyrthosiphon* (Homoptera, Aphididae) from *Primula* in Britain. Systematic Entomology 6: 97–101. doi: 10.1111/j.1365-3113.1981.tb00019.x

Maryańska-Nadachowska A (2002) A review of karyotype variation in jumping plant-lice (Psylloidea, Sternorrhyncha, Hemiptera) and checklist of chromosome numbers. Folia Biologica (Krakow) 50(3-4): 135–152.

Mayo ZB, Starks KJ (1972) Chromosome comparisons of biotypes of *Schizaphis graminum* to one another and to *Rhopalosiphum maidis*, *Rhopalosiphum padi*, and *Sipha flava*. Annals of the Entomological Society of America 65(4): 925–928. doi: 10.1093/aesa/65.4.925

Misra SD, Kurl SP (1983) Variation in chromosome number in *Myzus persicae* Sulzer. Pranikee 4: 202–209

Monti V, Lombardo G, Loxdale HD, Manicardi GC, Mandrioli M (2012a) Continuous occurrence of intra-individual chromosome rearrangements in the peach potato aphid, *Myzus persicae* (Sulzer) (Hemiptera: Aphididae). Genetica 140: 93–103. doi: 10.1007/s10709-012-9661-x

Monti V, Mandrioli M, Rivi M, Manicardi GC (2012b) The vanishing clone: karyotypic evidence for extensive intraclonal genetic variation in the peach potato aphid, *Myzus persicae* (Hemiptera: Aphididae). Biological Journal of the Linnean Society 105(2): 350–358. doi: 10.1111/j.1095-8312.2011.01812.x

Monti V, Manicardi GC, Mandrioli M (2010) Distribution and molecular composition of heterochromatin in the holocentric chromosomes of the aphid *Rhopalosiphum padi* (Hemiptera: Aphididae). Genetica 138: 1077–1084. doi: 10.1007/s10709-010-9493-5

Monti V, Manicardi GC, Mandrioli M (2011) Cytogenetic and molecular analysis of the holocentric chromosomes of the potato aphid *Macrosiphum euphorbiae* (Thomas, 1878). Comparative Cytogenetics 5(3): 163–172. doi: 10.3897/compcytogen.v5i3.1724

Morgan TH (1906) The male and female eggs of the phylloxerans of the hickories. Biological Bulletin 10(5): 201–206. doi: 10.2307/1535539

Morgan TH (1909a) Sex determination and parthenogenesis in Phylloxerans and Aphids. Science, New Series 29(739): 234–237.

Morgan TH (1909b) A biological and cytological study of sex determination in Phylloxerans and Aphids. Journal of Experimental Zoology 7(2): 239–352. doi: 10.1002/jez.1400070203

Morgan TH (1912) The elimination of the sex chromosomes from the male-producing eggs of Phylloxerans. Journal of Experimental Zoology 12(4): 479–498. doi: 10.1002/jez.1400120403

Morgan TH (1915) The predetermination of sex in Phylloxerans and Aphids. Journal of Experimental Zoology 19(3): 285–321. doi: 10.1002/jez.1400190303

Muramoto N (1987) On the chromosome polymorphisms and the sex determination mechanism of the chestnut aphid, *Lachnus tropicalis* (Homoptera). Proceedings of the Japan Academy, Series B 63(3): 83–86. doi: 10.2183/pjab.63.83

Normark BB (1999) Evolution in a putatively ancient asexual aphid lineage: recombination and rapid karyotype change. Evolution 53(5): 1458–1469. doi: 10.2307/2640892

Normark BB (2003) The evolution of alternative genetic systems in insects. Annual Review of Entomology 48: 397–423. doi: 10.1146/annurev.ento.48.091801.112703

Novotná J, Havelka J, Starý P, Koutecký P, Vítkova M (2011) Karyotype analysis of the Russian wheat aphid, *Diuraphis noxia* (Kurdjumov) (Hemiptera: Aphididae) reveals a large X chromosome with rRNA and histone gene families. Genetica 139: 281–289. doi: 10.1007/s10709-011-9546-4

Nur U (1979) Gonoid thelytoky in soft scale insects (Coccidae: Homoptera). Chromosoma (Berlin) 72: 89–104. doi: 10.1007/BF00286431

Nur U (1980) Evolution of unusual chromosome systems in scale insects (Coccoidea: Homoptera). In: Blackman RL, Hewitt GM, Ashburner M (Eds) Insect Cytogenetics. London, 97–117.

Nur U (1982) Destruction of specific heterochromatic chromosomes during spermatogenesis in the Comstockiella chromosome system (Coccoidea: Homoptera). Chromosoma (Berlin) 85: 519–530. doi: 10.1007/BF00327347

Nur U, Brown SW, Beardsley JW (1987) Evolution of chromosome number in mealybugs (Pseudococcidae: Homoptera). Genetica 74: 53–60. doi: 10.1007/BF00055094

Nur U (1990) Parthenogenesis. In: Rosen D (Ed.) Armored scale insects: their biology, natural enemies and control. World Crop Pests, Amsterdam, 191–197.

Olive AT (1967) Chromosomes of the aphid genus *Dactynotus* (Homoptera). Proceedings of the Entomological Society of Washington 69(4): 303–306.

Orlando E (1965) Due tipi di ovari partenogenetici in *Aphis fabae* Scop. Bollettino di Zoologia Napoli 32(1): 27–31. doi: 10.1080/11250006509441008

Orlando E (1974) Sex determination in *Megoura viciae* Bukton (Homoptera Aphididae). Monitore Zoologico Italiano 8(1-2): 61–70.

Orlando E (1983) Chromosomal abnormalities in male producing-eggs: a study in *Megoura viciae* (Homoptera, Aphidiae). Genetica 62(1): 55–59. doi: 10.1007/BF00123311

Pagliai AM (1961) L'Endomeiosi in *Toxoptera aurantiae* (Boyer de Foscolombe) (Homoptera, Aphididae). Atti della Accademia nazionale dei Lincei. Rendiconti. Classe di scienze fisiche, matematiche e naturali, ser. VIII, 31: 455–457.

Pagliai AM (1962) La Maturazione Dell'Uovo Partenogenetico e Dell'Uovo Anfigonico in *Brevicoryne brassicae*. Caryologia 15(3): 537–544. doi: 10.1080/00087114.1962.10796078

Pagliai AM (1963) Ricerche cariologiche su *Eriosoma lanigerum* Hausm.: (Homoptera, Aphididae). Bolletino di Zoologia 30(1): 85–90. doi: 10.1080/11250006309442154

Pagliai AM (1965) Endomeiosi in *Acyrthosiphon pisum* Harris. Caryologia 18(2): 235–240. doi: 10.1080/00087114.1965.10796168

Pagliai AM (1966) Il cariotipo di quattro specie di Dactynotinae. Caryologia 19(4): 505–512. doi: 10.1080/00087114.1966.10796239

Pagliai AM (1967) Aspects de l'ovogenèse parthénogénétique dans les différents groupes d'Aphidiens. Annales de la Société entomologique de France (N. S.) 3(3): 835–843.

Pal NB, Khuda-Bukhsh AR (1980) Chromosome numbers of fifteen species of aphids (Homoptera: Aphididae) from North-west Himalayas. Chromosome Information Service 29: 14–15.

Pal NB, Khuda-Bukhsh AR (1982) Chromosome numbers of eight species of aphids (Homoptera: Aphididae) from Kashmir valley. Chromosome Information Service. 32: 17–18.

Pal NB, Khuda-Bukhsh AR (1983) Chromosome affinity in four species of gall forming aphids from Garhwal Himalayas. Environment and Ecology 1: 97–99.

Pal NB, Khuda-Bukhsh AR (1984) Karyotypic studies in three species of aphids (Homoptera: Aphididae) from Garhwal Himalayas. Zoologica Orientalis 1(1): 11–12.

Panigrahy CB, Patnaik SC (1987) Chromosomal studies in four species of Indian aphids. Journal of Aphidology 1 (1-2): 29–34.

Panigrahy CB, Patnaik SC (1991) Intraspecific chromosomal variation in five species of aphids (Aphididae: Homoptera: Insecta). Cytologia 56: 379–387. doi: 10.1508/cytologia.56.379

Raychaudhuri D, Das PL (1987) Importance of karyology in aphid taxonomy. Proceedings of the Indian Academy of Sciences, Animal Sciences 96(5): 461–467. doi: 10.1007/BF03179600

Reeta Devi, Gautam DC (2012) Chromosome studies on aphids from Kullu region of Himachal Pradesh, India. Nucleus 55(3): 175–179. doi: 10.1007/s13237-012-0073-1

Remaudière G, Remaudière M (1997) Catalogue des Aphididae du monde. Paris, 475 pp.

Ris H (1942) A cytological and experimental analysis of the meiotic behaviour of the univalent X-chromosome in the bearberry aphid *Tamalia* (= *Phyllaphis*) *coweni* (Ckll.). Journal of Experimental Zoology 90(2): 267–330. doi: 10.1002/jez.1400900207

Rivi M, Cassanelli S, Mazzoni E, Bizzaro D, Manicardi GC (2009) Heterochromatin and rDNA localization on the holocentric chromosomes of black bean aphid, *Aphis fabae* Scop. (Hemiptera: Aphididae). Caryologia 62(4): 341–346.

Rivi M, Monti V, Mazzoni E, Cassanelli, Panini M, Bizzaro D, Mandrioli M, Manicardi GC (2012) Karyotype variations in Italian populations of the peach-potato aphid *Myzus per-*

sicae (Hemiptera: Aphididae). Bulletin of Entomological Research 102(6): 663–671. doi: 10.1017/S0007485312000247

Robinson AG, Chen YH (1969a) Cytotaxonomy of Aphididae. Canadian Journal of Zoology 47(4): 511–516. doi: 10.1139/z69-090

Robinson AG, Chen YH (1969b) Observations on *Rhopalosiphum padi* and *R. fitchii* (Homoptera: Aphididae) in Manitoba. The Canadian Entomologist 101(1): 110–112. doi: 10.4039/Ent101110-1

Rubín de Celis VE, Gassen DN, Santos-Colares MC, Oliveira AK, Valente VLS (1997) Chromosome studies on south Brazilian wheat pest aphids *Sitobion avenae*, *Schizaphis graminum*, and *Methopolophium dirhodum* (Homoptera: Aphididae). Brazian Journal of Genetics 20(3): 415–419.

Rubín de Celis VE, Ortiz M (1993) *Chaitophorus leucomelas* Koch (Homoptera: Aphididae, Chaitophorinae) nuevo registro para Sudamérica. Revista Peruana de Entomologia 35: 53.

Rukavischnikov YuM (1974) About karyology of aphids with cyclic parthenogenesis (Homoptera, Cinarini). In: Petrov DF (Ed.) Amopictic reproduction and heterosis. Novosinirsk, 229–232. [In Russian]

Rukavischnikov YuM (1979) Karyology and phylogeny of aphids inhabiting arboreal plants (Homoptera, Aphidoidea). In: Chubareva LA (Ed.) Karyosystematics of invertebrate animals, Leningrad, 20–24. [In Russian]

Samkaria R, Bala J, Gautam DC (2010) Karyotype studies on some commonly occurring aphid species. Nucleus 53(1-2): 55–59. doi: 10.1007/s13237-010-0011-z

Schrader F (1931) The chromosome cycle of *Protortonia primitiva* (Coccidae) and consideration of the meiotic division apparatus in the male. Zeitschrift für Wissenschaftliche Zoologie 38: 386–408.

Schwartz H (1932) Der Chromosomenzyklus von *Tetraneura ulmi* De Geer. Zeitschrift für Zellforschung und Mikroskopische Anatomie 15(4): 645–686. doi: 10.1007/BF00585855

Searle JB, Mittler TE (1991) Embryogenesis and the production of males by apterous viviparae of the green peach aphid *Myzus persicae* in relation to photoperiod. Journal of Insect Physiology 27(2): 145–153. doi: 10.1016/0022-1910(81)90121-9

Sen S, Khuda-Bukhsh AR (1992) Chromatid separation initiating from the NOR-bearing end of the metaphase chromosomes of two species of *Aphis* (Homoptera: Aphididae). Cytologia 57(4): 507–510. doi: 10.1508/cytologia.57.507

Sethi J, Nagaich BB (1972) Chromosome number of different clones of *Myzus persicae* with varying virus transmission efficiency. Indian Journal of Experimental Biology 10(2): 154–155.

Shaposhnikov GCh (1964) Suborder Aphidinea. In: Bei-Bienko GYa (Ed.) Keys for the insects of European part of USSR. Moscow-Leningrad, 489–616.

Shaposhnikov GCh (1985) The main features of the evolution of aphids. In: Szelegiewicz H (Ed) Evolution and biosystematics of aphids: Proceedings of the International Aphidological Symposium at Jablonna, 5–11 April, 1981. Polska Akademia Nauk, Instytut Zoologii, Jablona, 19–99.

Shcherbakov DE (1990) Extinct four-winged ancestors of scale insects (Homoptera: Sternorrhyncha). Proceedings of the Sixth International Symposium of Scale Insect Studies, Part II. August 6–12, 1990, Krakow, Poland, 23–29.

Shcherbakov DE (2007) Extinct four-winged precoccids and the ancestry of scale insects and aphids (Hemiptera). Russian Entomological Journal 16(1): 47–62.

Shcherbakov DE, Popov YuA (2002) Superorder Cimicidea. In: Rasnitsyn AP, Quicke DLJ (Eds). History of insects. New York, Boston, Dordrecht, London, Moscow, 143–157.

Shibata B (1941) Ecological and cytological study on aphids. Ôyô-dôbutugaku Zasshi 13: 162. [In Japanese]

Shinji O (1923) Chromosomal studies on the germ cells of aphids. Zoological Magazine 35: 240–251. [In Japanese]

Shinji O (1927) Studies in the germ cells of aphids. The Bulletin of the Morioka Imperial College of Agriculture and Forestry 11: 1–121.

Shinji O (1931) The evolutional significance of the chromosomes of the Aphididae. Journal of Morphology 51: 373–433. doi: 10.1002/jmor.1050510204

Shinji O (1941a) Monograph of Japanese Aphididae. Shinkyo Sha Shoin, Tokyo, 1215 pp. [In Japanese]

Shinji O (1941b) On the chromosomes of some aphids. Ôyô-dôbutugaku Zasshi 13: 163. [In Japanese]

Spence JM, Blackman RL (1998) Orientation of the "stretched' univalent X chromosome during the unequal first meiotic division in male aphids. Chromosome Research 6(7): 177–181. doi: 10.1023/A:1009203500012

Spence JM, Blackman RL (2000) Inheritance and meiotic behaviour of a de novo chromosome fusion in the aphid *Myzus persicae* Sulzer. Chromosoma (Berlin) 109(7): 490–497. doi: 10.1007/s004120000100

Spence JM, Blackman RL, Testa JM, Ready PD (1998) A 169-base pair tandem repeat DNA marker for subtelomeric heterochromatin and chromosomal rearrangements in aphids of the Myzus persicae group. Chromosome Research 6(3): 167–175. doi: 10.1023/A:1009251415941

Steffan AW (1968a) Zum Generations- und Chromosomenzyklus der Adelgidae (Homoptera: Aphidina). Verhandlungen der Deutschen Zoologischen Gesellschaft. Vol. 15(20). Zoologischer Anzeiger, Supplement 31: 762–773.

Steffan AW (1968b) Evolution und systematik der Adelgidae (Homoptera: Aphidina): Eine Verwandtschaftsanalyse auf vorwiegend ethologischer, zytologischer und karyologischer Grundlage. Zoologica 115(40, 5): 1–139.

Stevens NM (1905a) Studies in Spermatogenesis with especial reference to the "accessory chromosome". Carnegie Institution of Washington publication 36(1): 1–33.

Stevens NM (1905b) A study of the germ cells of *Aphis rosae* and *Aphis oenoterae*. Journal of Experimental Zoology 2(3): 313–334. doi: 10.1002/jez.1400020302

Stevens NM (1906) Studies on the germ cells of aphids. Carnegie Institution of Washington publication 51: 1–29. doi: 10.5962/bhl.title.23703

Stevens NM (1909) An unpaired heterochromosome in the aphids. Journal of Experimental Zoölogy 6(1): 115–124. doi: 10.1002/jez.1400060105

Stevens NM (1910) A Note on Reduction in the Maturation of Male Eggs in *Aphis*. Biological Bulletin 18(2): 72–75. doi: 10.2307/1535909

Stschelkanovzew JP (1904) Uber die Eireifung bei viviparen Aphiden. Biologisches Zentralblatt 24(3): 104–112.

Sun RY, Robinson AG (1966) Chromosome studies on 50 species of aphids. Canadian Journal of Zoology 44(4): 649–653. doi: 10.1139/z66-063

Sunnucks P, England PE, Taylor AC, Hales DF (1996) Microsatellite and chromosome evolution of parthenogenetic *Sitobion* aphids in Australia. Genetics 144(2): 747–756.

Sunnucks P, Hales DF (1996) Numerous transposed sequences of mitochondrial cytochrome oxidases I-II in aphids of the genus *Sitobion* (Hemiptera: Aphididae). Molecular Biology and Evolution 13(3): 510–524. doi: 10.1093/oxfordjournals.molbev.a025612

Suomalainen E (1933) Der Chromosomencyclus von *Macrosiphum pisi*. Zeitschrift fur Zellforohung und Mikroskopische Anatomy 19(3): 583–594. doi: 10.1007/BF00393360

Takada H, Blackman RL, Miyasaki M (1978) Cytological, morphological, and biological studies on a laboratory-reared triploid clone of *Myzus persicae* (Sulzer). Kontyu 46(4): 557–573.

Tannreuther GW (1907) History of the germ cells and early embryology of certain aphids. Zoologische Jahrbücher. Abteilung für Anatomie und Ontogenie der Tiere 24: 609–640.

Terradot L, Simon J-C, Leterme N, Bourdin D, Wilson ACC, Gauthier J-P, Robert Y (1999) Molecular characterization of clones of the *Myzus persicae* complex (Hemiptera: Aphididae) differing in their ability to transmit the potato leafroll luteovirus (PLRV). Bulletin of Entomological Research 89: 355–363. doi: 10.1017/S0007485399000498

Turak E, Hales DF (1990) Sitobion genetics and the environment. Acta Phytopathologica et Entomologica Hungarica 25(1-4): 307–314.

Turčinavičienė J, Rakauskas R, Lazutka JR (1997) Karyotypes of three aphid species: *Aphis triglochinis*, *Aphis grossulariae* and *Aphis schneideri*. Biologija 4: 60–62.

Ueshima N (1979) Hemiptera II: Heteroptera. In: John B (Ed.) Animal Cytogenetics. 3. Insecta 6. Berlin, Stuttgart, 113 pp.

Valenzuela I, Eastop VF, Ridland PM, Weeks AR (2009) Molecular and morphometric data indicate a new species of the aphid genus *Rhopalosiphum* (Hemiptera: Aphididae). Annals of the Entomological Society of America 102(6): 914–924. doi: 10.1603/008.102.0602

Voronova NV, Vishnevskaya MV, Buga SV (2010) Karyotype of *Macrosiphum knautiae* Holman, 1972 (Rhynchota: Homoptera: Aphididae). Vestnik Belorusskogo Gosudarstvennogo Universiteta, seriya 2, biologiya, khimiya, geographiya 2: 70–73. [In Russian]

White MJD (1973) Animal Cytology and Evolution. Cambridge, 961 pp.

Wilson ACC, Sunnucks P, Blackman RL, Hales DFH (2002) Microsatellite variation in cyclically parthenogenetic populations of *Myzus persicae* in south-eastern Australia. Heredity 88(4): 258–266. doi: 10.1038/sj.hdy.6800037

Wilson ACC, Sunnucks P, Hales DFH (1999) Microevolution, low clonal diversity and genetic affinities of parthenogenetic Sitobion aphids in New Zealand. Molecular Ecology 8(10): 1655–1666. doi: 10.1046/j.1365-294x.1999.00751.x

Wilson ACC, Sunnucks P, Hales DFH (2003) Heritable genetic variation and potential for adaptive evolution in asexual aphids (Aphidoidea). Biological Journal of the Linnean Society 79: 115–135. doi: 10.1046/j.1095-8312.2003.00176.x

Wojciechowski W (1992) Studies on the systematic system of aphids (Homoptera, Aphidinea). Katowice, 75 pp.

Wysoki M, Swirski E (1970) The chromosomes and a deviation from parthenogenesis in *Aphanostigma piri*. The Journal of Heredity 61(2): 73–74.

Yang X-w, Zhang X-x (2000) Karyotypic polymorphism in different geographic populations of green peach aphid *Myzus persicae* (Sulzer) in China. Entomologia Sinica 7(1): 29–35.

Yang X-w, Zhang S-f, Zhang X-x (2000) Karyotypes of green peach aphids from different host plants. Chinese Journal of Applied and Environmental Biology 6(1): 56–60.